



FORMATION

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Subject: 2012 Fish Tissue & Macro Invertebrate Monitoring Results

Formation Capital Corporation, U.S. (Formation), submits the attached 2012 Fish Tissue & Macro Invertebrate Monitoring Results for the Idaho Cobalt Project (ICP) pursuant to the NPDES Permit. A hard copy of this submittal is provided for your and those courtesy copied on this transmittal.

If you have any questions about this submittal please contact me by telephone at 208-756-4578 ext. 26 or by email at wgscales@formcap.com.

Respectfully,

Wm. G. (Bill) Scales
President

Attachment

CC:
IDEQ Attn: Water Division
NMFS Attn: Director
U.S. Fish and Wildlife

JGIS
6/20/13 f

IDAHO COBALT PROJECT

**FISH TISSUE & MACROINVERTEBRATE
MONITORING RESULTS**

**In accordance with
United States Environmental Protection Agency
National Pollutant Discharge Elimination System
Permit No. ID-002832-1**

Prepared for:

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1.0 INTRODUCTION

Formation Capital Corporation, U.S. (Formation) retained Hildebrand & Associates, LLC (Hildebrand) to collect aquatic benthic macroinvertebrates (Macroinvertebrates) and fish tissue samples to evaluate the macroinvertebrate community structure and bioaccumulation of trace metals in fish tissue in Big Deer Creek and in Upper Blackbird Creek located within Salmon-Cobalt Ranger District of the Salmon National Forest. This biological monitoring project and summary report has been prepared for Formation's Idaho Cobalt Project in accordance with Formation's final National Pollutant Discharge Elimination System (NPDES) permit number ID-002832-1.

2.0 SAMPLING APPROACH

Based on locations identified in the Idaho Cobalt NPDES Quality Assurance Project Plan (TELESTO, 2010) and Biological Monitoring and Assessment Program (ENVIRON, 2009), one macroinvertebrate monitoring station and three fish tissue monitoring stations were established within the Salmon-Cobalt Ranger District of the Salmon National Forest. Samples were collected from September 4th, 2012 through September 5th, 2012.

2.1 SITE SELECTION AND LOCATIONS

One macroinvertebrate monitoring station (BDC01) and one fish tissue monitoring station (BDC-01-01) was established in Big Deer Creek, downstream of Formation's proposed water treatment discharge outfall 001. Site BDC01 was selected to assess potential changes in the macroinvertebrate community structure. Site BDC-01-01 was selected to assess potential fish tissue bioaccumulation. Fish tissue concentrations are monitored for bioaccumulation of metals so that tissue concentrations can be compared prior to discharge to post discharge. Macroinvertebrate community structure is monitored so that macroinvertebrate composition can be compared prior to discharge to post discharge.

One fish tissue monitoring station was established in Big Deer Creek (BDC-02) upstream of Formation's proposed water treatment discharge outfall 001. An additional fish tissue monitoring reference station was established in Upper Blackbird Creek (UBC-01). The macroinvertebrate sampling locations are presented in Figure 1. Fish tissue monitoring locations are presented in Figure 2 and Figure 3.

3.0 SAMPLING METHODS

Beneficial Use Reconnaissance Program Protocols (BURP) developed by the Idaho Department of Environmental Quality (DEQ, 2007) was used to evaluate the biological assemblages and physical habitat structure. Included in the BURP are measures of water quality, collection of benthic macroinvertebrates and evaluations of physical habitat. Embeddedness and substrate size, one of the most important determinations of habitat for fish and macroinvertebrates were evaluated by conducting a modified Wolman Pebble Count (Wolman et al., 1954) to quantify substrate size distribution in riffle habitats. Sampling methods are described below.

3.1 IN SITU WATER QUALITY

In situ water quality measurements were collected at each monitoring station including the freshwater fish pond and included instantaneous measurements of pH (standard units), conductivity (micromhos per centimeter) [$\mu\text{mhos/cm}$], water temperature (degrees Celsius [$^{\circ}\text{C}$]), dissolved oxygen (DO) (milligrams per liter [mg/L]) and percent DO saturation. These measurements serve to identify water quality conditions which may affect aquatic life. In situ water quality measurements were collected prior to collection of fish and macroinvertebrates and habitat evaluations. An YSI 556 multi-parameter field instrument, calibrated prior to use, was positioned at approximately 0.5 feet in the water column in an undisturbed area of the monitoring station. Once the YSI stabilized, in situ water quality measurements were recorded. YSI 556 calibration results are included in Appendix A. In addition, stream discharge was measured utilizing a Marsh McBirney Flo-Mate 2000 Digital Flow Meter.

3.2 MACROINVERTEBRATE SAMPLING

Macroinvertebrates were collected on September 4th, 2012 under Idaho Department of Fish and Game (IDFG) Scientific Collecting Permit No. F-12-12-12 (Appendix B). To minimize impacts to the benthic community in Big Deer Creek, macroinvertebrate community sampling was only performed. Due to their limited mobility and relatively long life span, macroinvertebrates integrate and reflect water quality effects over time and are excellent indicators of stress in aquatic systems. Additionally, macroinvertebrates with certain environmental tolerances may provide some insight into the presence of water toxicity.

Macroinvertebrate sampling followed bioassessment methodologies of the IDEQ BURP. The IDEQ BURP methodology includes qualitative habitat evaluations, macroinvertebrate collections and processing techniques, and taxa identification procedures. For the Idaho Cobalt Project, quantitative macroinvertebrate samples were collected using a Hess Sampler fitted with a 500 micron (μm) mesh collection net. The macroinvertebrate sampling reach was approximately 30-times the bankfull width which equated to 450 feet (137 meters). Three evenly spaced riffle transects (T1, T2, and T3) (Figure 1) were established within BDC01 and macroinvertebrate samples were collected from each separate transect for a total of three macroinvertebrate samples. To provide consistency in the sampling design, the Hess Sampler was used to collect macroinvertebrates at all 3 transects.

3.3 MACROINVERTEBRATE HANDLING AND ANALYSIS

Macroinvertebrate samples were stored and preserved in individual 1-liter Nalgene® High-Density Polyethylene (HDPE) sample containers with 99 percent isopropyl. Sample containers were labeled both inside and outside with labels containing the following information: station number, stream name, date and time of collection, and sample type. Macroinvertebrate samples were checked for adequate preservation, placed inside sampling coolers, and were secured in locked field vehicles for the duration of the project.

Upon return from the field, macroinvertebrate samples were shipped by ground transport to EcoAnalysts, Inc., in Moscow, Idaho. Macroinvertebrate samples were processed following the IDEQ BURP methodology of removing the first 500 animals and identifying the invertebrates to species or genus/species subgroups whenever possible. Each sample was mixed thoroughly on a sieve and split into eight homogeneous fractions. Each of the eight fractions was placed in a numbered tray. A random number generator was used to select the order in which the trays were sorted until the required total of 500 organisms per sample was reached or, if there were fewer than 500 organisms present in a sample, until all organisms were removed. The fraction of sample sorted to obtain the 500 invertebrates was recorded so that invertebrate abundance can be converted to number of organisms/meter squared (m^2) for comparison to future studies.

3.4 BIOTIC INDICES

Macroinvertebrate data was evaluated using the Stream Macroinvertebrate Index (SMI) developed by the IDEQ as part of their ecological assessment approach to determine appropriate life use support in Idaho's streams. The component metrics of the SMI are as follows:

- **Total Taxa** – Number of distinct taxa found in the macroinvertebrate assemblage at each station. Generally, the number of taxa decreases in response to increasing perturbation.
- **Ephemeroptera Taxa** – Number of mayfly taxa, which generally decreases in response to increasing perturbation.
- **Plecoptera Taxa** – Number of stonefly taxa, which generally decreases in response to increasing perturbation.
- **Trichoptera Taxa** – Number of caddisfly taxa, which generally decreases in response to increasing perturbation.
- **% Plecoptera** – Percent of sample that is stonefly nymphs. Predicted to decrease in response to increasing perturbation.
- **Hilsenhoff Biotic Index (HBI)** – Abundance-weighted average tolerance to pollution. Originally a measure of tolerance to organic pollutants, but commonly used for evaluating responses to organic and toxic pollutants. Predicted to increase in response to increasing perturbation.
- **% 5 Dominant Taxa** – Percent of the sample that are the five most dominant taxa. Predicted to increase in response to increasing perturbation.
- **Scraper Taxa** – Number of invertebrate taxa that feed by scraping. This metric provides an indication of the riffle community food base (e.g. periphyton). Scrapers increase with increased abundance of periphyton and decrease as fine particle material increases. Their abundance generally decreases in response to increasing perturbation.
- **Clinger Taxa** – Number of invertebrate taxa that are clingers. Clingers have fixed retreats or adaptations for attaching to surfaces in flowing water. They are adapted to life in running waters and are sensitive to hydrologic perturbation, habitat disturbance, and other pollutants. Their abundance generally decreases in response to increasing perturbation.

In addition to the metrics used in the calculation of the SMI, total invertebrate abundance (density), mayfly abundance, % mayflies, biomass and an index of metal tolerance was evaluated.

3.5 HABITAT ASESMENT

Physical habitat quality is a major determinant of biological diversity of stream macroinvertebrate communities. In conjunction with macroinvertebrate sampling, a visual qualitative aquatic and riparian habitat assessment was completed in BDC - 01 and BDC - 02. The visual assessment of aquatic and riparian habitat is consistent with IDEQ BURP and parameters assessed as part of the habitat evaluation include stream discharge, canopy cover, in-stream cover, embeddedness in riffles and pools, channel shape, disruptive pressure, zone of influence, pool substrate characteristics and pool variability. Additional stream characteristics were recorded and included large organic debris, pool count, stream sinuosity, and Rosgen stream type. While these additional stream characteristics do not receive habitat assessment scores they still provide valuable stream habitat data that can be evaluated through time.

3.6 SUBSTRATE SIZE CHARACTERIZATION

Substrate characteristics are important determinants of habitat for fish and macroinvertebrates in streams (Kaufmann and Robison 1998, Kaufmann et al. 1999), and are often sensitive indicators of anthropogenic impacts on streams (Minshall et al 1985). Substrate size characterization was used to evaluate pre and post discharge effects on BDC - 01. Cobble-sized substrate provides the greatest amount of usable habitat to benthic macroinvertebrates, while smaller sized substrate offers reduced habitat for colonization (Green et al. 2000). Substrate size characterization was evaluated using the modified Wolman Pebble Count (Wolman et al., 1954). Results of the pebble count are discussed in Section 4.5.

3.7 FISH TISSUE COLLECTION

A total of 30 fish tissue samples were collected by rod and reel during September 4th and 5th, 2012 under IDFG Scientific Collecting Permit No. F-12-12-12 (Appendix B). Fish tissue samples were collected following the protocols as found in IDEQ's Implementation Guidance for the Idaho Mercury Water Quality Criteria (IDEQ 2005).

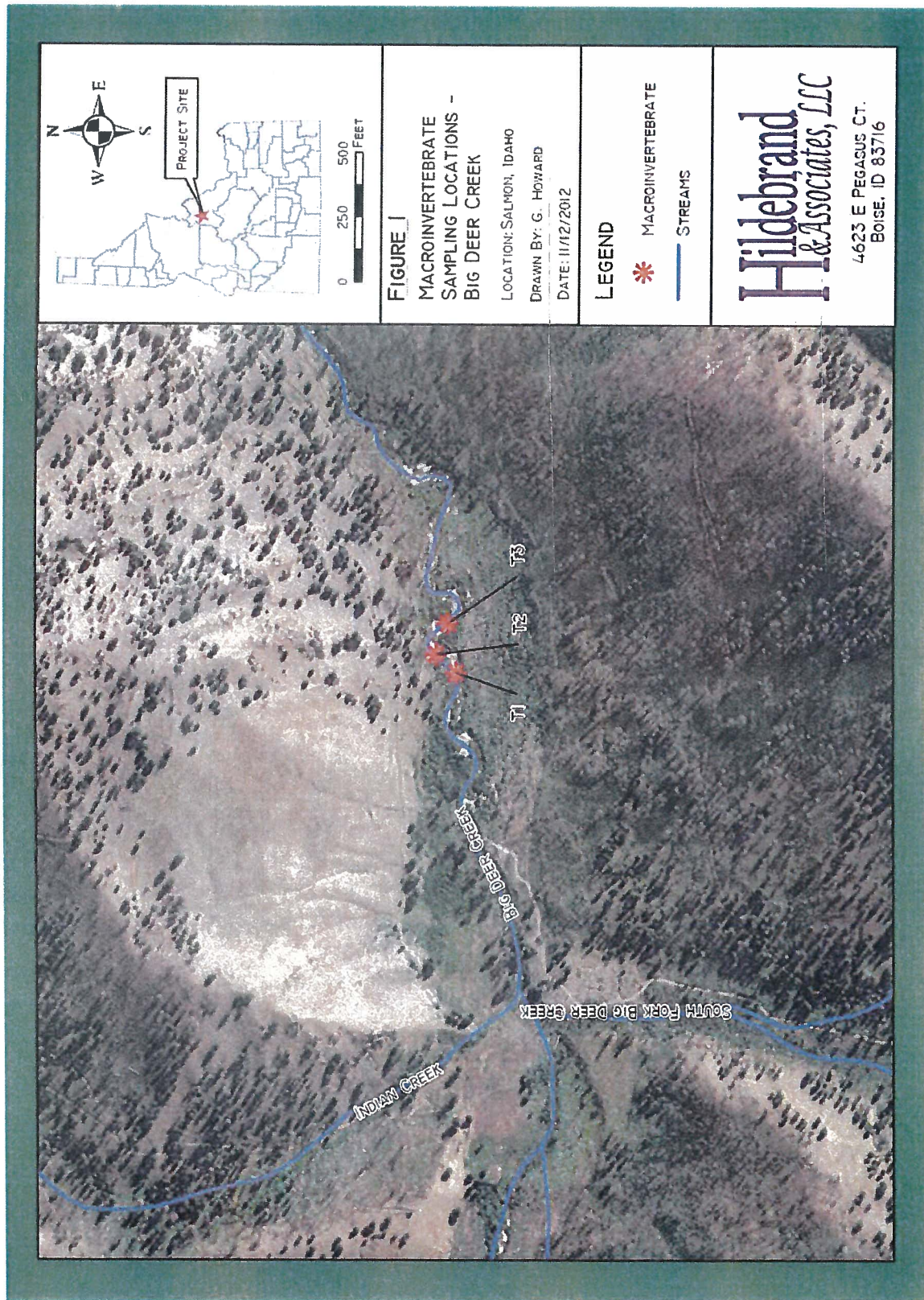
Ten individual fish tissue samples were collected from each monitoring station (Figure 2 and Figure 3). The species along with species length, sample location, date and time of collection and GPS coordinates were recorded on standardized field data sheets are provided in Appendix C. Each collected fish was also digitally photographed with an individual sample identifier based on the date and sample location. Digital photographs are provided on compact disk. Once collected and logged fish tissue samples were packaged and stored on ice in a cooler for the duration of the sampling event. Samples were frozen upon return

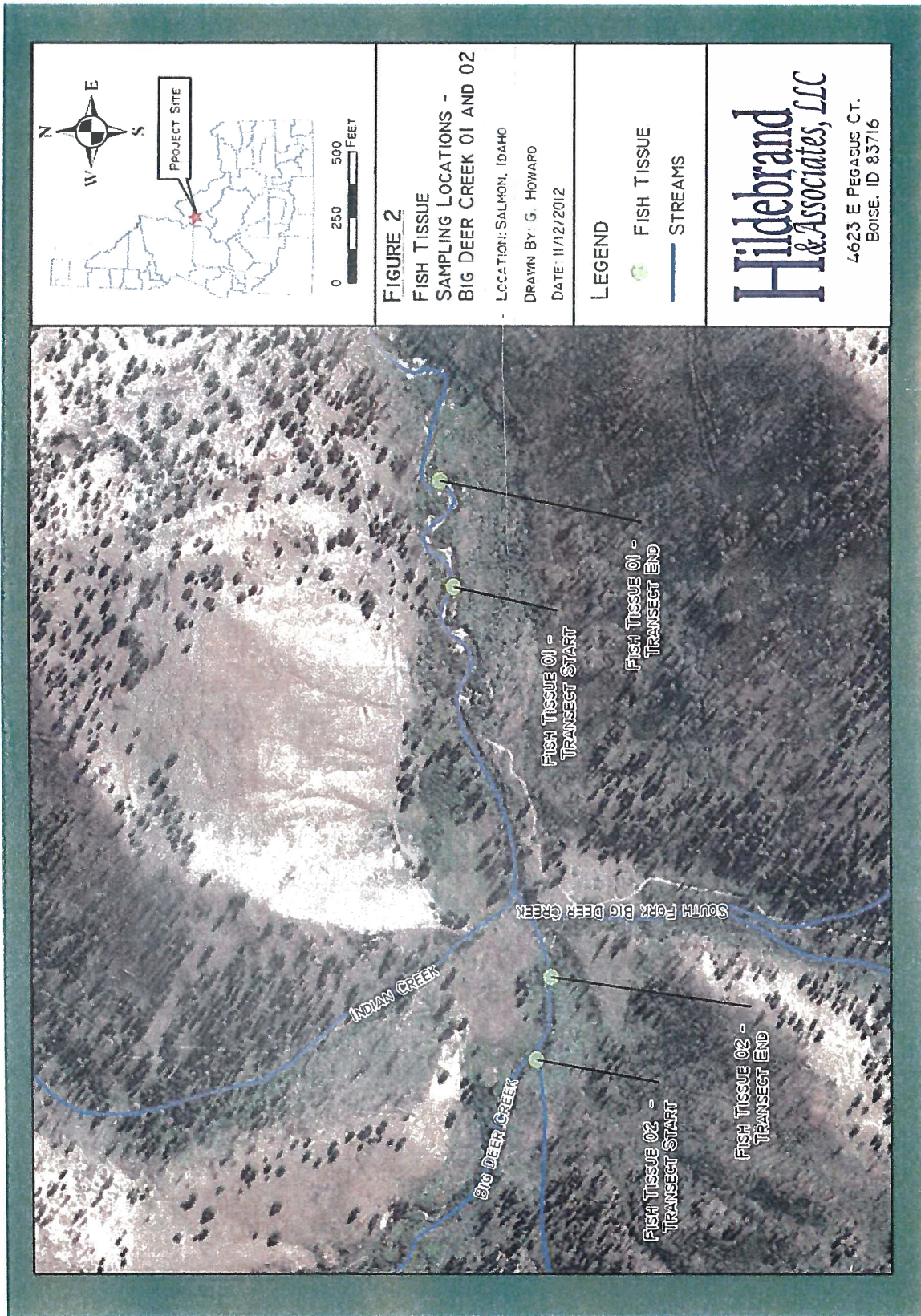
from the field and then were shipped on dry ice to ALS Environmental (formerly Columbia Analytical Services) in Kelso, Washington for chemical analyses.

3.8 FISH TISSUE HANDLING AND ANALYSIS

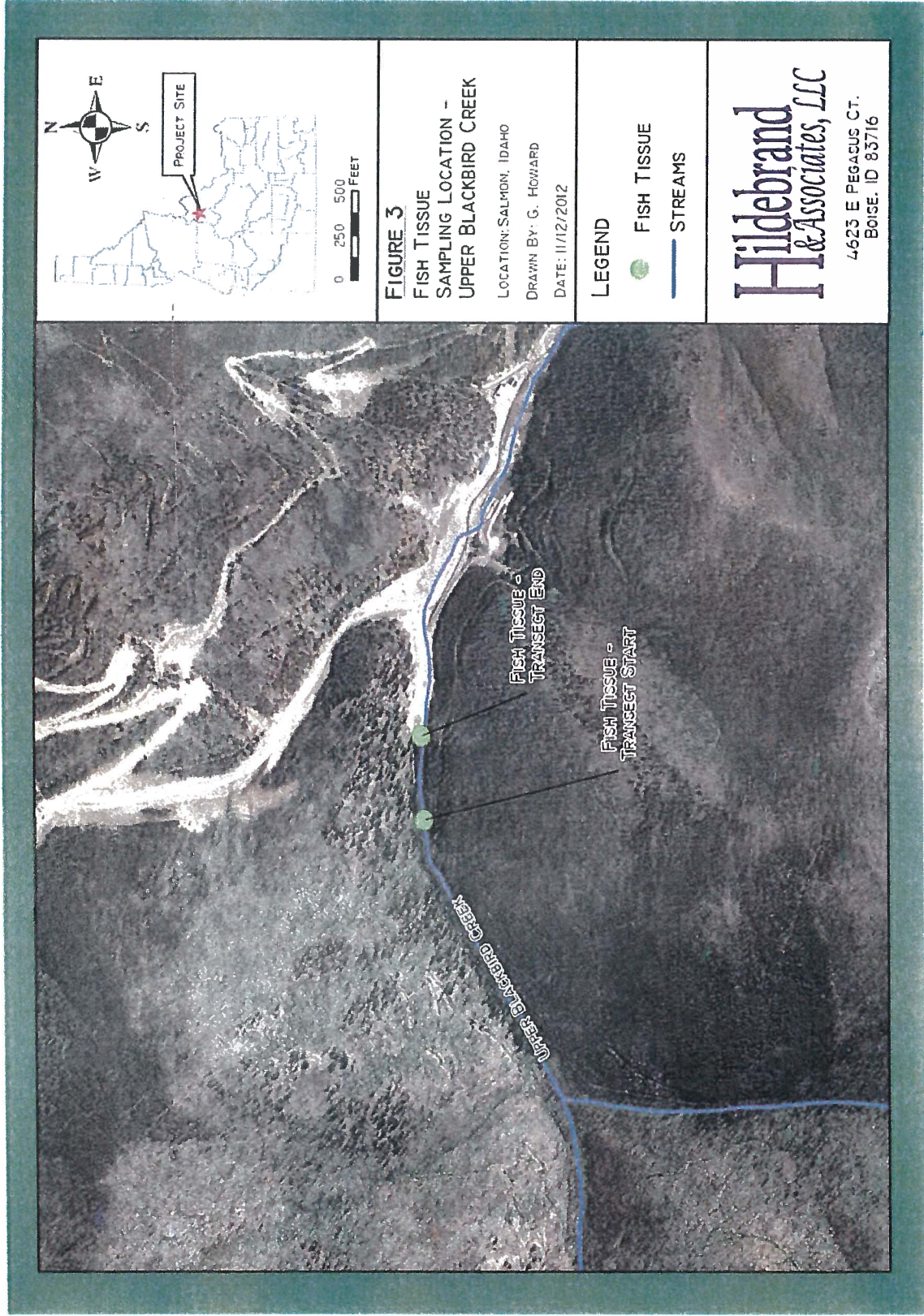
Fish tissue samples were handled according to the protocols outlined in the IDEQ's Implementation Guidance for the Idaho Mercury Water Quality Criteria (IDEQ 2005) which were adopted from the Idaho Fish Consumption Advisory Program (IFCAP) and United States Geological Survey (USGS) sampling techniques. This included clean sampling handling techniques for low level metals analysis to preclude false positives arising from sample collection, sample handling, or analysis.

Whole individual fish samples were wrapped in Glad ® Plastic Wrap and packaged individually in re-sealable plastic bags (e.g. Ziploc™). To ensure sample bags did not leak, samples were individually double bagged and samples from an individual site were packaged in a single, larger Ziploc™ bag. To ensure tissue samples were prepared in a laboratory clean-room environment using non-contaminating techniques, whole fish samples were shipped to ALS Environmental in Kelso, Washington for chemical analysis. Per the IDEQ mercury water quality criteria guidance (IDEQ, 2005), all fish tissue samples were analyzed as fillets without skin. Since the proposed sample number is relatively small, individual fillet samples were homogenized and were analyzed for total aluminum, arsenic, cadmium, cobalt, lead, manganese, mercury, nickel selenium, thallium and zinc. Fish tissue samples were first analyzed for total mercury and would be only analyzed for methylmercury if total mercury concentrations were within 20 percent of the IDEQ fish tissue mercury criterion of 0.3 milligrams per kilogram on a wet weight basis (mg/kg ww).





FORMATION CAPITAL CORPORATION, U.S.
IDAHO COBALT PROJECT
NPDES FISH TISSUE & MACROINVERTEBRATE SUMMARY REPORT



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3.9 CHAIN OF CUSTODY

Samples collected in the field represent physical evidence and their possession must be traceable from the time of collection until the data are ultimately used. Proper chain of custody (COC) procedures was used to maintain and document sample possession. Completed COC forms accompanied each macroinvertebrate and fish tissue sample to their respective laboratory. Executed COC forms are provided in Appendix D.

3.9.1 QUALITY ASSURANCE AND QUALITY CONTROL

An inherent difficulty exists in generating blanks for solid samples such as fish; there is no blank tissue that can be used. Fish fillets are inherently difficult to contaminate because they are a solid medium. Only the surface is exposed to contamination before being pureed. Also, the much higher concentrations of mercury and other contaminants in fillets compared to water are not easily changed by small amounts of contamination. Since there will be no dissecting or filleting of fish in the field, deionized water washes or rinses of equipment did not take place. Therefore, field blanks were not analyzed in this study.

Homogenization blanks were used to assess potential contamination from analytical equipment. Homogenization blanks are equivalent to equipment blanks and were collected by running deionized water through the homogenization equipment. ALS Environmental analyzed one homogenization blank per sampling round or 1 for every 10 samples, whichever is greater. Method blanks were also used to assess potential contamination from analytical equipment. ALS Environmental analyzed one method blank for every sample batch or every 20 samples, whichever is more frequent. Method blanks consist of an analyte-free matrix that is subjected to the entire analytical process.

For analyzing macroinvertebrate samples, performance objectives associated primarily with measurement error were followed. Measurement error and performance objectives followed EPA Guidance for Quality Assurance Plans EPA240/R-02/009.

4.0 RESULTS AND DISCUSSION

4.1 IN SITU WATER QUALITY

In situ water quality measurements (pH, conductivity, water temperature, dissolved oxygen (DO) and DO percent saturation) were collected at each of the fish tissue and macroinvertebrate sampling stations including the freshwater fish pond (Table 1). The pH values are not considered acidic, they are slightly basic and ranged from 7.58 to 7.87 and are in the acceptable range for salmonid and macroinvertebrate species. Water temperature and DO are two of the most critical factors in determining salmonid survival. For many species of salmonids, exposure to low levels of DO (less than 5.0 - 6.0 mg/l) and exposure to high water temperatures (above 25°C) can result in mortality. Water temperature and DO were within the optimal range for spawning, egg development and growth. In situ water quality measurements of DO ranged from 10.06 mg/l to 12.90 mg/l and water temperature ranged from 5.37 °C to 10.27°C, indicating a cold water and oxygen-rich environment.

Table 1. In Situ Water Quality Measurements

Station	Stream Name	Date	T (°C)	pH	DO (mg/L)	DO (% sat.)	Conductivity (µmhos/cm)
BDC-01	Big Deer Creek	9/4/12	8.36	7.58	11.45	97.3	108
BDC-02	Big Deer Creek	9/4/12	10.27	7.87	10.24	95.9	84
UBC-01	Upper Blackbird Creek	9/5/12	5.37	7.77	12.90	102.6	75
FWFP	Freshwater Fish Pond	9/5/12	8.21	7.72	10.06	86.0	75

4.2 MACROINVERTEBRATES

Overall, 65 taxa were collected from 3 samples (Appendix E). Macroinvertebrates were identified to the lowest practical taxon. As discussed previously, the choice of core metrics was consistent with the Stream Macroinvertebrate Index (SMI) developed by the IDEQ to determine appropriate life use support in Idaho's streams.

The results of the macroinvertebrate collection in riffle habitat show that:

- The number of all macroinvertebrates was 228, 447 and 500, at BDC – 01 T1, T2 and T3, respectively;
- Idaho SMI basin ratings were rated “very good” for all three macroinvertebrate transects. T1 was rated 94.64, T2 was rated 99.84 and T3 was rated 97.12;
- The Hilsenhoff Biotic Index (HBI) derives a community-based estimate of overall pollution at a given site. HBI tolerance values range from 0 -10, with 0 being the most pollution intolerant and 10 being the most pollution tolerant taxa. HBI values were 2.81, 3.19 and 3.13 for T1, T2 and T3 respectively. The low HBI values indicate the presence of sensitive (intolerant) organisms;
- The Metals Tolerance Index (MTI) is based upon a correlation of invertebrate species present in known metals contaminated streams versus those present in unimpacted streams. MTI values were 2.57, 2.58 and 2.51 for T1, T2 and T3 respectively. The low MTI values indicate the presence of sensitive (intolerant) organisms to metals contamination;
- The Fine Sediment Biotic Index (FSBI) is a measure of the number of species present that are tolerant of increased sediment in the stream substrate. FSBI values were 120, 153 and 144 for T1, T2 and T3. The high FSBI indicates there are more sediment tolerant species present in the sample;
- The Shannon-Weaver index is a measure of the number of species (i.e., diversity) and the number of individuals within each species (i.e., evenness). The Shannon-Weaver index values were 4.69, 4.79 and 4.42 for T1, T2 and T3. A Low Shannon-Weaver index value indicates low species diversity;
- The EPT Index, a summation of taxa in the pollution-sensitive Ephemeroptera (mayflies),

Plecoptera (stoneflies), and Trichoptera (caddisflies), is a richness measure specifically focusing on the presence/absence of pollution-sensitive fauna. The EPT values were 56.14, 56.60 and 48.00 percent for T1, T2 and T3 respectively. Mayflies, stoneflies and caddisflies are associated with healthy streams, the percent of mayflies, caddisflies and stoneflies indicate that water pollution is currently not a problem;

- A composition measure, percent Chironomidae plus Oligochaeta represents the numerical abundance of pollution-tolerant midges and aquatic worms. In a healthy, balanced macroinvertebrate community, percentages of pollution-tolerant organisms are minimal. This was the case in BDC01, percent Chironomidae plus Oligochaeta were 10.53, 19.91 and 10.20 at T1, T2 and T3 respectively;
- All identifiable macroinvertebrates were dried and weighted to calculate dry biomass. Extremely low biomasses were encountered at each macroinvertebrate transect. Biomass was 0.055 grams, 0.157 grams and 0.118 grams for T1, T2 and T3 respectively.

4.3 HABITAT ASSESSMENT SUMMARY

Numeric habitat ratings were developed for BDC - 01 and BDC - 02 using IDEQ BURP Habitat Assessment Protocol. Using this method, seven qualitative instream variables were evaluated for the entire sampling reach. Instream habitat parameters were each scored separately and individual habitat scores were summed to provide a total habitat score. Instream habitat scores present current habitat conditions of the stream, without considering historical or future conditions. Physical habitat scores for BDC - 01 and BDC - 02 are presented in Table 2. Additional instream characterization was conducted to assess potential fish and macroinvertebrate habitat. Additional characterization scores are not summed, are not added to the overall instream habitat scores and are identified in Table 2 with an asterisk.

The following habitat conditions were noted:

- Total habitat scores were 81 and 78 (out of a possible 115) for BDC - 01 and BDC - 02 respectively;
- The overall instream physical habitat conditions were considered very good for the two reaches;
- The instream conditions were similar for both Big Deer Creek reaches, including a substrate dominated by cobble with riffle embeddedness ranging between 25 to 50 percent;
- In both reaches pool variability was excellent, consisting of an even mix of deep and shallow pools;

- Pool substrate in both reaches was comprised of cobble and gravel with a soft clay or mud bottom;
- Large woody debris which provided stream stability and fish habitat was qualitatively assessed and was medium at BDC – 02 and high at BDC – 01;
- Instream cover for fish was optimal in both reaches. In BDC – 01 instream cover was greater than 50 percent, while instream cover in BDC – 02 was 40 percent;
- BDC – 01 was absent of overhanging canopy cover which reduces allochthonous input and can increase stream temperature. BDC – 02 had a good mix of overhanging canopy.

Table 2. Physical Habitat Assessment Data

Habitat Parameter	BDC -01	BDC -02	T1	T2	T3
Instream cover (for fish)	18	17			
Embeddedness (in riffles)	11	10			
Channel Shape	3	3			
Disruptive Pressures (on streambanks)	9	9			
Zone of Influence (width of riparian zone)	8	8			
Pool Substrate Characteristics	15	15			
Pool Variability	17	16			
Canopy Closure – BDC -01 *					
Left Bank			03	02	14
Center Up			00	00	00
Center Down			00	00	00
Right Bank			02	00	00
Canopy Closure – BDC-02 *					
Left Bank			05	05	08
Center Up			06	08	05
Center Down			06	05	06
Right Bank			09	05	04
Pool Count *	11	8			
Large Organic Debris (LOD) * ¹	33	11			
Rosgen Stream Type *	B	B			
Submerged Cover (%) *	40	35			
Undercut Banks (%) *	15	10			
Average Pool Depth (ft) * ²	2.2	2.9			
Overhead Cover (%) *	15	45			
Stream Sinuosity *	M	M			
Total Habitat Score	81	78			

* Score does not count towards habitat assessment

¹ LOD has a diameter greater than 10 centimeters (4 inches) and a length greater than one meter (39 inches)

M –Riffle-dominated, moderate sinuosity

² Average pool depth is based on four representative pool measurements

4.4 STREAM DISCHARGE SUMMARY

Using a Marsh-McBirney Digital Flo-Mate 2000 Digital Flow Meter, twenty stream discharge measurements were collected downstream of transect 3 in BDC – 01. Stream discharge measurements are provided in Table 3. Stream discharge was measured during summer base flow which is a measure of minimum stream size and an indicator of potential fish and macroinvertebrate habitat. Total stream discharge was 7.88 cubic feet per second (CFS) which is optimal for fish spawning and fish migration paths. Flow patterns also showed a positive relationship between the proportion and abundance of stoneflies, mayflies and caddisflies collected. This is not surprising, as these species are known in general to require cold, well-oxygenated, flowing water (Merritt et al., 2008; Wiggins, 1996; Stewart & Stark, 2002).

Table 3. Stream Discharge Measurements – BDC - 01

Tape (ft)	Width (ft)	Depth (ft)	Area (ft²)	Velocity (ft/sec)	Total Discharge (ft/sec)
(LWE) 0					
1.3	0.55	0.04	0.02	0.3	0.01
2.0	0.65	0.13	0.08	0.94	0.08
2.7	0.50	0.46	0.23	1.22	0.28
3.4	0.45	0.43	0.19	1.67	0.32
4.1	0.40	0.69	0.28	1.96	0.55
4.8	0.45	0.78	0.35	1.91	0.67
5.5	0.50	0.69	0.35	1.18	0.41
6.2	0.50	0.72	0.36	2.06	0.74
6.9	0.50	0.75	0.38	1.91	0.73
7.6	0.50	0.66	0.33	1.82	0.60
8.3	0.50	0.56	0.28	1.80	0.50
9.0	0.45	0.59	0.27	1.50	0.41
9.7	0.40	0.56	0.22	1.69	0.37
10.4	0.45	0.59	0.27	1.55	0.42
11.1	0.50	0.52	0.26	1.52	0.40
11.5	0.50	0.56	0.28	1.37	0.38
12.0	0.50	0.59	0.30	1.18	0.35
12.7	0.50	0.56	0.28	1.32	0.37
13.5	0.50	0.43	0.22	0.89	0.20
14.7	0.65	0.20	0.13	0.72	0.09
(RWE) 0					
Total Discharge (CFS)					7.88

4.5 SUBSTRATE SIZE CHARACTERIZATION

Stream substrate is the site of most biotic activity such as algae growth, insect growth and development,

fish egg incubation, and small fish refuge (Davis et al., 2001). Fine sediment and its accumulation can be detrimental to salmonid spawning (a beneficial use) since it may limit the quality and quantity of the inter-gravel spaces that are critical for egg incubation (Maret et al., 1993; Scrivener et al., 1989; Young et al., 1991). Following the sample design and analysis employed by IDEQ BURP, a modified Wolman Pebble Count (Wolman et al., 1954) was conducted to quantify substrate size and composition at the same three riffle transects where macroinvertebrate samples were collected. At each transect, substrate particles (e.g., cobble, sand, gravel, etc.) were selected at evenly spaced intervals across each transect (left, left middle, middle, right middle, and right), were measured (to the nearest millimeter [mm]), and were recorded on Wolman Pebble Count Data Sheets (Appendix F). A minimum of 50 particle measurements were made per riffle.

Wolman Pebble Count Data revealed predominate substrate size consisted of Very Coarse Pebbles (31.1 mm to 64 mm), Small Cobble (64.1 mm to 128 mm), and Large Cobble (128.1 mm to 256 mm). The mean substrate size was calculated and ranged between 74.4 mm to 149.3 mm. Cobble-sized substrate provides the greatest amount of usable habitat to benthic macroinvertebrates. However, the embeddedness (the degree to which very coarse pebbles and larger sizes of particles (cobbles and boulders) are surrounded or covered by fine sediment in riffle and pool habitat ranged from 20 to 90 percent and embeddedness averaged 55 percent.

4.6 FISH TISSUE CONCENTRATIONS

In accordance with the IDEQ mercury water quality criteria guidance (IDEQ, 2005), all fish tissue samples were analyzed as fillets without skin. Each individual fillet sample was homogenized and was analyzed for total mercury, aluminum, arsenic, cadmium, cobalt, lead, manganese, nickel selenium, thallium and zinc. Fish tissue samples were first analyzed for total mercury and were to be only analyzed for methylmercury if total mercury concentrations were within 20 percent of the IDEQ fish tissue mercury criterion of 0.3 milligrams per kilogram on a wet weight basis (mg/kg ww). A summary of analytical results for each subset of metal compounds is provided below. A copy of the fish tissue analytical report is provided on compact disk.

Mercury

EPA Method 1631, Revision E, Mercury in Water by Oxidation, Purge and Trap, and Cold Vapor

Atomic Fluorescence Spectrometry was used for the determination of mercury (dry & wet weight) in fish tissue. Mercury was detected in all fish tissue samples. Dry weight mercury concentrations in BDC - 01 ranged from 0.0774 milligrams per kilogram (mg/Kg) to 0.300 mg/kg. The average dry weight mercury concentration was 0.185 mg/Kg. Dry weight mercury concentrations in BDC - 02 ranged from 0.166 mg/Kg to 0.498 mg/Kg. The average dry weight mercury concentration was 0.296 mg/Kg. Dry weight mercury concentrations in UBC - 01 ranged from 0.154 mg/Kg to 0.618 mg/Kg. The average dry weight mercury concentration was 0.258 mg/Kg.

Wet weight mercury concentrations in BDC - 01 ranged from 0.01 mg/Kg to 0.06 mg/kg. The average wet weight mercury concentration was 0.04 mg/Kg. Wet weight mercury concentrations in BDC - 02 ranged from 0.03 mg/Kg to 0.103 mg/Kg. The average wet weight mercury concentration was 0.06 mg/Kg. Wet weight mercury concentrations in UBC - 01 ranged from 0.03 mg/Kg to 0.117 mg/Kg. The average wet weight mercury concentration was 0.05 mg/Kg. Mercury concentrations in all fish tissue samples were below the IDEQ fish tissue mercury criterion of 0.3 mg/Kg on a wet weight basis (mg/Kg ww). Therefore, methylmercury concentrations in fish tissue were not analyzed. A complete summary of all metal results are presented in Tables 4 through 13 (Appendix G).

Selenium

EPA Method 7742, Atomic Absorption, Borohydride Reduction was used for the determination of selenium (dry & wet weight) in fish tissue. Selenium was detected in all fish tissue samples. Dry weight selenium concentrations in BDC - 01 ranged from 0.63 mg/Kg to 2.08 mg/Kg. The average dry weight selenium concentration was 1.58 mg/Kg. Dry weight selenium concentrations in BDC - 02 ranged from 0.29 mg/Kg to 2.66 mg/Kg. The average dry weight selenium concentration was 1.67 mg/Kg. Dry weight selenium concentrations in UBC - 01 ranged from 0.51 mg/Kg to 1.93 mg/Kg. The average dry weight selenium concentration was 1.42 mg/Kg. Wet weight selenium concentrations in BDC - 01 ranged from 0.14 mg/Kg to 0.48 mg/Kg. The average wet weight selenium concentration was 0.347 mg/Kg. Wet weight selenium concentrations in BDC - 02 ranged from 0.24 mg/Kg to 0.72 mg/Kg. The average wet weight selenium concentration was 0.424 mg/Kg. Wet weight selenium concentrations in UBC - 01 ranged from 0.12 mg/Kg to 0.40 mg/Kg. The average wet weight selenium concentration was 0.292 mg/Kg. A complete summary of all metal results are presented in Tables 4 through 13 (Appendix G).

Trace Metals

EPA Method 200.8, Inductively Coupled Plasma – Mass Spectrometry was used for the determination of trace metals (dry & wet weight) in fish tissue. For the Idaho Cobalt project, trace metals consist of aluminum, arsenic, cadmium, cobalt, lead, manganese, nickel, thallium and zinc. Trace metals were detected in extremely low concentration ranges in all fish tissue samples. A complete summary of all metal results are presented in Tables 4 through 13 (Appendix G).

4.7 CONCLUSIONS

In situ water quality measurements indicate pH values are not acidic, they are slightly basic and ranged from 7.58 to 7.87 and are in the acceptable range for fish and macroinvertebrate species. Water temperature and DO, two of the most critical limiting factors for fish and macroinvertebrates are within the optimal range for spawning, egg development and growth. In situ water quality measurements of DO ranged from 10.06 mg/l to 12.90 mg/l and water temperature ranged from 5.37 °C to 10.27°C, indicating a cold water and oxygen-rich environment.

Overall, 65 macroinvertebrate taxa were collected from 3 samples in BCD – 01. The Idaho SMI basin ratings were rated “very good” for all three macroinvertebrate samples, T1 was rated 94.64, T2 was rated 99.84 and T3 was rated 97.12. Of the individual core metrics, percent EPT revealed there is a good presence of pollution-sensitive fauna indicating good water quality. Conversely, the percent Chironomidae plus Oligochaete were low indicating the abundance of pollution-tolerant midges was low. Other metrics sensitive to pollution and metals contamination, including HBI and MTI were also low indicating water pollution and metals contamination was low. The Fine Sediment Biotic Index (FSBI) was high, ranging from 120 to 153, indicating there are more sediment tolerant species present. The Shannon-Weaver index revealed low species diversity. In addition to low species diversity, macroinvertebrate biomass was extremely low ranging from 0.055 grams to 0.118 grams.

Total habitat scores were 81 and 78 (out of a possible 115) for BDC - 01 and BDC - 02 respectively. The instream conditions were similar for both Big Deer Creek reaches, including a substrate dominated by cobble with riffle embeddedness ranging between 25 to 50 percent. In both reaches pool variability was excellent, consisting of an even mix of deep and shallow pools. Instream cover for fish was optimal in both reaches. In BDC – 01 instream cover was greater than 50 percent, while instream cover in BDC – 02 was 40 percent.

Thirty individual fish tissue samples were analyzed for total mercury, aluminum, arsenic, cadmium,

cobalt, lead, manganese, nickel selenium, thallium and zinc. Low concentrations of metals including mercury were detected in all fish tissue samples. Mercury concentrations were below the IDEQ fish tissue mercury criterion of 0.3 milligrams per kilogram on a wet weight basis (mg/kg ww) and therefore methylmercury concentrations were not analyzed.

5.0 REFERENCES

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APPENDIX A

YSI CALIBRATION RESULTS

INSTRUMENT CALIBRATION REPORT



Pine Environmental Services, Inc.

7332 S. Alton Way, Bldg. 13, Suite E.
Centennial, CO 80112

Toll-free: (866) 960-PINE (7463)

Pine Environmental Services, Inc.

Instrument ID 18971
Description YSI 556
Calibrated 8/28/2012

Manufacturer YSI
Model Number 556
Serial Number/ Lot 11J102923
Number
Location Colorado
Department

State Certified
Status Pass
Temp °C 24

Humidity % 25

Calibration Specifications

Group # 1				Range Acc % 0.0000			
Group Name PH				Reading Acc % 3.0000			
Stated Accy Pct of Reading				Plus/Minus 0.00			
<u>Nom In Val / In Val</u>	<u>In Type</u>	<u>Out Val</u>	<u>Out Type</u>	<u>Fnd As</u>	<u>Lft As</u>	<u>Dev%</u>	<u>Pass/Fail</u>
7.00 / 7.00	PH	7.00	PH	7.00	7.00	0.00%	Pass
4.00 / 4.00	PH	4.00	PH	4.00	4.00	0.00%	Pass
10.00 / 10.00	PH	10.00	PH	10.00	10.00	0.00%	Pass

Group # 2				Range Acc % 0.0000			
Group Name Conductivity				Reading Acc % 3.0000			
Stated Accy Pct of Reading				Plus/Minus 0.000			
<u>Nom In Val / In Val</u>	<u>In Type</u>	<u>Out Val</u>	<u>Out Type</u>	<u>Fnd As</u>	<u>Lft As</u>	<u>Dev%</u>	<u>Pass/Fail</u>
1.413 / 1.413	ms/cm	1.413	ms/cm	1.413	1.413	0.00%	Pass

Group # 3				Range Acc % 0.0000			
Group Name Redox (ORP)				Reading Acc % 3.0000			
Stated Accy Pct of Reading				Plus/Minus 0.00			
<u>Nom In Val / In Val</u>	<u>In Type</u>	<u>Out Val</u>	<u>Out Type</u>	<u>Fnd As</u>	<u>Lft As</u>	<u>Dev%</u>	<u>Pass/Fail</u>
240.00 / 240.00	mv	240.00	mv	240.00	240.00	0.00%	Pass

Group # 4				Range Acc % 0.0000			
Group Name Dissolved Oxygen Span				Reading Acc % 3.0000			
Stated Accy Pct of Reading				Plus/Minus 0.00			
<u>Nom In Val / In Val</u>	<u>In Type</u>	<u>Out Val</u>	<u>Out Type</u>	<u>Fnd As</u>	<u>Lft As</u>	<u>Dev%</u>	<u>Pass/Fail</u>
100.00 / 100.00	%	100.00	%	100.00	100.00	0.00%	Pass

Group # 5
Group Name Dissolved Oxygen Zero
Test Performed: Yes As Found Result: Pass

As Left Result: Pass

APPENDIX B

SCIENTIFIC COLLECTION PERMIT AND REPORTING DOCUMENTS



Idaho Dept. of Fish and Game
2012 Scientific Collecting Permit
Permit # F-12-12-12 – Greg Hildebrand, Hildebrand & Associates, LLC

ISSUED TO: Greg Hildebrand
c/o Hildebrand & Associates, LLC
4623 E Pegasus Ct
Boise, ID 83716

Start Date: 07/02/2012
Expiration: 12/31/2012
Doc# 749-12-000057

You and your sub-permittees are authorized to sample and/or collect fish in the below listed drainages utilizing the prescribed methods identified in this permit. You must be present during all collection activities. **This permit must be in your or your sub-permittee's possession while in the field or transporting biological samples.**

SUB-PERMITTEES: Amy Chadwick

PURPOSE: Specimen collection, presence/absence, density estimate, vouchering (up to stated limits)

SPECIES: Rainbow trout; brook trout; cutthroat trout; brown trout; up to thirty (30) total may be vouchered

APPROVED METHODS OF SAMPLING: Electrofishing, seining, hook-and-line

GEOGRAPHIC AREAS OR WATERS: Salmon National Forest - Big Deer Creek, South Fork Big Deer Creek, Blackbird Creek

DISPOSITION OF SAMPLES: All live nontarget fish will be released back into the water where they were captured. Whole fish samples will be shipped to Columbia Analytical Services, Inc. in Kelso, WA. See Condition #2 below concerning bull trout mortalities.

PERMIT PROVISIONS:

1. This permit is not transferable, nor may its authority be delegated. It shall be produced for inspection upon request of any conservation officer or other authorized representative of the Idaho Department of Fish and Game. Any abuse or misuse of privileges granted by this permit shall be grounds for revocation.
2. **YOU ARE WORKING IN WATERS WHERE BULL TROUT ARE KNOWN TO EXIST:** this permit authorizes you as an agent of Idaho Department of Fish and Game to "take" bull trout. Take is defined as: observe, harass, capture, handle/tag, mark, measure, release, and indirect mortality. Any observations or handling of bull trout must specifically be reported in your permit report. **Bull trout mortalities will be reported to Scott Grunder (scott.grunder@idfg.idaho.gov) at IDFG within 72 hours.** The report will include location, size, and mortality factor. As per USFWS direction, bull trout mortality may be disposed of in the stream where captured.
3. No electrofishing is allowed in known bull trout spawning areas between August 15 and September 15. If spawning activity is observed during sampling, please document the location and avoid the area. Please note this information on your end-of-year report.
4. Upon completion of work or upon expiration of this permit and/or prior to any request for renewal, a report shall be submitted within 30 days, to Idaho Department of Fish and Game, Bureau of Fisheries, 600 S. Walnut, P.O. Box 25, Boise, ID 83707, providing useful and comparable information on fish collected or waters sampled. Forms are included to assist in providing information.



Idaho Dept. of Fish and Game
2012 Scientific Collecting Permit

Permit # F-12-12-12 -- Greg Hildebrand, Hildebrand & Associates, LLC

5. All stationary equipment used to collect fish and wildlife (nets, traps, etc.) will have an attached metal tag bearing, in legible English, the name and current address of the permit holder.
6. **NO COLLECTIONS SHALL BE MADE UNDER THIS PERMIT UNTIL THE LOCAL CONSERVATION OFFICER OR THE PANHANDLE REGIONAL OFFICE (TOM CURET) IS NOTIFIED WHERE AND WHEN THE COLLECTION IS TO BE MADE. THIS MUST BE DONE WITHIN 48 HOURS OF SAMPLING.** A record of dates, times and persons notified shall be kept and submitted at the end of the year as part of the collecting report.
7. A valid fishing license is needed to conduct angling surveys.

Cc: Salmon Regional Office
208-756-2271
208-769-6274 (fax)

Virgil Moore, Director

June 29, 2012
Date Issued

**Idaho Department of Fish and Game
Scientific Collecting Permit
Mandatory Report Form**

Permit Number: F-12-12-12

Permit Holder: Greg Hildebrand Affiliation: Hildebrand & Associates, LLC

A standard inventory data set will be required for any fish community or presence/absence sampling survey within the state. Additional data is welcomed; however, this minimum amount of information must be collected for each transect (site), and the form(s) returned as part of the required report. **DO NOT COMBINE TRANSECTS ONTO ONE FORM EVEN IF IN THE SAME STREAM.** If your report/data is compatible with the requirements of this form, they will be accepted. Please write legibly. **FAILURE TO COMPLETE THIS FORM AS REQUIRED MAY BE GROUNDS FOR FUTURE PERMIT DENIAL.**

Stream Name: Big Deer Creek Transect (Sample Site) No.: BDC 01 Collection Date: 09-04-12

Location: Big Deer Creek, Salmon-Challis NF - Downstream of Proposed Discharge Outfall
(DO NOT LEAVE BLANK)

(GPS Coordinates of lower end of sampling reach – Latitude, Longitude, or UTM with zone datum)
45.10'0.1.1" 114.21'47.1"

Estimator (✓): Direct observation (Snorkeling) ☐ Mark/Recapture ☐ Presence/Absence ☐

Depletion (one or more electrofish passes) ☐ Hook & Line

Water Temp. (C°): 8.36

Transect Length (M): 137 Transect Width (M): 4.5
(At least one pool/riffle/run complex.) (At least 4 measurements for an average.)

Optional information on permanent fish barriers:

Location: N/A Height: N/A if manmade – type: N/A

NOTICE OF COLLECTION:

IDFG Person Contacted: Tom Curet Date & Time of Contact: 8-31-12: 14:26

Disposition of Fish: Columbia Analytical Services

Report densities/CPUE in the table below. Indicate type of gear used. Record fishing effort and age class by species.

Fish Species	Gear Type Used	Time Fished	#fish/100m ² or <u>CPUE</u>	Age Class (specify column)	
				No. of 0 year	No. of ≥ 1 year
Rainbow Trout	Hook & Line	1 Hour	10 Fish/Hr	Zero	10

NUMBERS OF NON-GAME FISH OBSERVATIONS SHOULD BE RECORDED ON ELECTROFISHING DATA SHEET

**Idaho Department of Fish and Game
Scientific Collecting Permit
Mandatory Report Form**

Stream Name: Big Deer Creek Transect (Sample Site) No.: BDC 01 Collection Date: 09-04-12
 Location: Inside Salmon-Challis NF Crew Leader: Greg Hildebrand Permit No.: F-12-12-12

Length Range	Species				Species			
(mm)	Rainbow			(mm)				
				310-319				
				320-329				
				330-339				
50-59				340-349				
60-69				350-359				
70-79				360-369				
80-89				370-379				
90-99				380-389				
100-109				390-399				
110-119				400-409				
120-129				410-419				
130-139				420-429				
140-149				430-439				
150-159				440-449				
160-169				450-459				
170-179				460-469				
180-189	I I			470-479				
190-199	II			480-489				
200-209	I I			490-499				
210-219	I			500-509				
220-229	II			510-519				
230-239				520-529				
240-249				530-539				
250-259	I			540-549				
260-269								
270-279								
280-289				Total Each Species	10 Rainbow Trout			
290-299								
300-309								

Density estimates are to be calculated and entered on the front page table.

Other species sampled/observed: N/A

**Idaho Department of Fish and Game
Scientific Collecting Permit
Mandatory Report Form**

Permit Number: F-12-12-12

Permit Holder: Greg Hildebrand Affiliation: Hildebrand & Associates, LLC

A standard inventory data set will be required for any fish community or presence/absence sampling survey within the state. Additional data is welcomed; however, this minimum amount of information must be collected for each transect (site), and the form(s) returned as part of the required report. **DO NOT COMBINE TRANSECTS ONTO ONE FORM EVEN IF IN THE SAME STREAM.** If your report/data is compatible with the requirements of this form, they will be accepted. Please write legibly. **FAILURE TO COMPLETE THIS FORM AS REQUIRED MAY BE GROUNDS FOR FUTURE PERMIT DENIAL.**

Stream Name: Big Deer Creek Transect (Sample Site) No.: BDC 02 Collection Date: 09-04-12

Location: Big Deer Creek, Salmon-Challis NF - Upstream of Proposed Discharge Outfall
(DO NOT LEAVE BLANK)

(GPS Coordinates of lower end of sampling reach – Latitude, Longitude, or UTM with zone datum)
45.09'56.8" 114.22'11.4"

Estimator (✓): Direct observation (Snorkeling) ☐ Mark/Recapture ☐ Presence/Absence ☐

Depletion (one or more electrofish passes) ☐ Hook and Line

Water Temp. (C°): 12.27

Transect Length (M): 100 Transect Width (M): 2.5
(At least one pool/riffle/run complex.) (At least 4 measurements for an average.)

Optional information on permanent fish barriers:

Location: N/A Height: N/A if manmade – type: N/A

NOTICE OF COLLECTION:

IDFG Person Contacted: Tom Curet Date & Time of Contact: 8-31-12: 14:26

Disposition of Fish: Columbia Analytical Services

Report densities/CPUE in the table below. Indicate type of gear used. Record fishing effort and age class by species.

Fish Species	Gear Type Used	Time Fished	#fish/100m ² or <u>CPUE</u>	Age Class (specify column)	
				No. of 0 year	No. of ≥ 1 year
Rainbow Trout	Hook & Line	80 Minutes	10 Fish/Hr	Zero	10

NUMBERS OF NON-GAME FISH OBSERVATIONS SHOULD BE RECORDED ON ELECTROFISHING DATA SHEET

**Idaho Department of Fish and Game
Scientific Collecting Permit
Mandatory Report Form**

Stream Name: Big Deer Creek Transect (Sample Site) No.: BDC 01 Collection Date: 09-04-12

Location: Inside Salmon-Challis NF Crew Leader: Greg Hildebrand Permit No.: F-12-12-12

Length Range	Species				Species			
(mm)	Rainbow				(mm)			
					310-319			
					320-329			
					330-339			
50-59					340-349			
60-69					350-359			
70-79					360-369			
80-89					370-379			
90-99					380-389			
100-109					390-399			
110-119					400-409			
120-129					410-419			
130-139					420-429			
140-149					430-439			
150-159					440-449			
160-169					450-459			
170-179					460-469			
180-189	II				470-479			
190-199	II				480-489			
200-209	IIII				490-499			
210-219	II				500-509			
220-229					510-519			
230-239					520-529			
240-249					530-539			
250-259					540-549			
260-269								
270-279								
280-289					Total	10 Rainbow Trout		
290-299					Each			
300-309					Species			

Density estimates are to be calculated and entered on the front page table.

Other species sampled/observed: N/A

**Idaho Department of Fish and Game
Scientific Collecting Permit
Mandatory Report Form**

Permit Number: F-12-12-12

Permit Holder: Greg Hildebrand Affiliation: Hildebrand & Associates, LLC

A standard inventory data set will be required for any fish community or presence/absence sampling survey within the state. Additional data is welcomed; however, this minimum amount of information must be collected for each transect (site), and the form(s) returned as part of the required report. **DO NOT COMBINE TRANSECTS ONTO ONE FORM EVEN IF IN THE SAME STREAM.** If your report/data is compatible with the requirements of this form, they will be accepted. Please write legibly. **FAILURE TO COMPLETE THIS FORM AS REQUIRED MAY BE GROUNDS FOR FUTURE PERMIT DENIAL.**

Stream Name: Upper Blackbird Creek Transect (Sample Site) No.: UBC Collection Date: 09-05-12

Location: Big Deer Creek, Salmon-Challis NF - Upstream of Proposed Discharge Outfall
(DO NOT LEAVE BLANK)

(GPS Coordinates of lower end of sampling reach - Latitude, Longitude, or UTM with zone datum)
45.07°01.50" 114.20°47.26"

Estimator (✓): Direct observation (Snorkeling) ☐ Mark/Recapture ☐ Presence/Absence ☐

Depletion (one or more electrofish passes) ☐ Hook and Line

Water Temp. (C°): 5.17

Transect Length (M): 100 Transect Width (M): 2
(At least one pool/riffle/run complex.) (At least 4 measurements for an average.)

Optional information on permanent fish barriers:

Location: N/A Height: N/A if manmade - type: N/A

NOTICE OF COLLECTION:

IDFG Person Contacted: Tom Curet Date & Time of Contact: 8-31-12: 14:26

Disposition of Fish: Columbia Analytical Services

Report densities/CPUE in the table below. Indicate type of gear used. Record fishing effort and age class by species.

Fish Species	Gear Type Used	Time Fished	#fish/100m ² or <u>CPUE</u>	Age Class (specify column)	
				No. of 0 year	No. of ≥ 1 year
Rainbow Trout x	Hook & Line	2 Hours	5 Fish/Hr	Zero	10
Cutthroat Hybrid					

NUMBERS OF NON-GAME FISH OBSERVATIONS SHOULD BE RECORDED ON ELECTROFISHING DATA SHEET

**Idaho Department of Fish and Game
Scientific Collecting Permit
Mandatory Report Form**

Stream Name: Upper Blackbird Creek Transect (Sample Site) No.: UBC Collection Date: 09-05-12
 Location: Inside Salmon-Challis NF Crew Leader: Greg Hildebrand Permit No.: F-12-12-12

Length Range	Species				Species				
(mm)	Rainbow x	Cutthroat	Hybrid		(mm)				
					310-319				
					320-329				
					330-339				
50-59					340-349				
60-69					350-359				
70-79					360-369				
80-89					370-379				
90-99					380-389				
100-109					390-399				
110-119					400-409				
120-129					410-419				
130-139					420-429				
140-149					430-439				
150-159					440-449				
160-169					450-459				
170-179					460-469				
180-189	I I				470-479				
190-199	II				480-489				
200-209	I				490-499				
210-219	III I				500-509				
220-229	I				510-519				
230-239					520-529				
240-249					530-539				
250-259					540-549				
260-269									
270-279									
280-289					Total Each Species	10 Rainbow x Hybrid	Cutthroat		
290-299									
300-309									

Density estimates are to be calculated and entered on the front page table.

Other species sampled/observed: N/A

APPENDIX C

FISH SPECIES COLLECTION FORMS

Idaho Cobalt Project - Fish Tissue Collection Log

Collection Method: Rod and Reel
Weather: Sunny

Sampler	Date	Stream Name	Fish ID	Fish Species	Length (mm)	Location Description
Hildebrand	09-04-2012	Big Deer Creek	BDC-01-01	Rainbow Trout	250	Downstream of Proposed Outfall
Chadwick	09-04-2012	Big Deer Creek	BDC-01-02	Rainbow trout	182	Downstream of Proposed Outfall
Wilkins	09-04-2012	Big Deer Creek	BDC-01-03	Rainbow Trout	199	Downstream of Proposed Outfall
	09-04-2012	Big Deer Creek	BDC-01-04	Rainbow Trout	190	Downstream of Proposed Outfall
	09-04-2012	Big Deer Creek	BDC-01-05	Rainbow Trout	219	Downstream of Proposed Outfall
	09-04-2012	Big Deer Creek	BDC-01-06	Rainbow Trout	225	Downstream of Proposed Outfall
	09-04-2012	Big Deer Creek	BDC-01-07	Rainbow Trout	204	Downstream of Proposed Outfall
	09-04-2012	Big Deer Creek	BDC-01-08	Rainbow Trout	228	Downstream of Proposed Outfall
	09-04-2012	Big Deer Creek	BDC-01-09	Rainbow Trout	207	Downstream of Proposed Outfall
	09-04-2012	Big Deer Creek	BDC-01-10	Rainbow Trout	184	Downstream of Proposed Outfall

09 : 00
09 : 01
09 : 02
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09 : 06
09 : 07
09 : 08
09 : 09

Idaho Cobalt Project - Fish Tissue Collection Log

Collection Method: Rod and Reel
Weather: Sunny

Sampler	Date	Stream Name	Fish ID	Fish Species	Length (mm)	Location Description
Hildebrand	09-04-2012	Big Deer Creek	BDC-02-01	Rainbow Trout	210	Upstream of Proposed Outfall
	09-04-2012	Big Deer Creek	BDC-02-02	Rainbow trout	208	Upstream of Proposed Outfall
	09-04-2012	Big Deer Creek	BDC-02-03	Rainbow Trout	203	Upstream of Proposed Outfall
	09-04-2012	Big Deer Creek	BDC-02-04	Rainbow Trout	206	Upstream of Proposed Outfall
	09-04-2012	Big Deer Creek	BDC-02-05	Rainbow Trout	181	Upstream of Proposed Outfall
	09-04-2012	Big Deer Creek	BDC-02-06	Rainbow Trout	216	Upstream of Proposed Outfall
	09-04-2012	Big Deer Creek	BDC-02-07	Rainbow Trout	209	Upstream of Proposed Outfall
	09-04-2012	Big Deer Creek	BDC-02-08	Rainbow Trout	190	Upstream of Proposed Outfall
	09-04-2012	Big Deer Creek	BDC-02-09	Rainbow Trout	194	Upstream of Proposed Outfall
	09-04-2012	Big Deer Creek	BDC-02-10	Rainbow Trout	182	Upstream of Proposed Outfall
Chadwick						
Wilkins						

Idaho Cobalt Project - Fish Tissue Collection Log

Collection Method: Rod and Reel

Weather: Sunny

Sampler	Date	Stream Name	Fish ID	Fish Species	Length (mm)	Location Description
Hildebrand Chadwick Wilkins	09-05-2012	Upper Blackbird Creek	UBC-01	Rainbow-Cutthroat X	221	Freshwater Fish Pond
	09-05-2012	Upper Blackbird Creek	UBC-02	Rainbow-Cutthroat X	199	Freshwater Fish Pond
	09-05-2012	Upper Blackbird Creek	UBC-03	Rainbow-Cutthroat X	215	Freshwater Fish Pond
	09-05-2012	Upper Blackbird Creek	UBC-04	Rainbow-Cutthroat X	218	Freshwater Fish Pond
	09-05-2012	Upper Blackbird Creek	UBC-05	Rainbow-Cutthroat X	210	Freshwater Fish Pond
	09-05-2012	Upper Blackbird Creek	UBC-06	Rainbow-Cutthroat X	192	Freshwater Fish Pond
	09-045-2012	Upper Blackbird Creek	UBC-07	Rainbow-Cutthroat X	214	Freshwater Fish Pond
	09-05-2012	Upper Blackbird Creek	UBC-08	Rainbow-Cutthroat X	184	Freshwater Fish Pond
	09-05-2012	Upper Blackbird Creek	UBC-09	Rainbow-Cutthroat X	207	Freshwater Fish Pond
	09-05-2012	Upper Blackbird Creek	UBC-10	Rainbow-Cutthroat X	185	Freshwater Fish Pond

APPENDIX D

CHAIN OF CUSTODY FORMS



CHAIN OF CUSTODY

1317 South 13th Ave., Kenosha, WI 53140 | 360.577.7222 | 800.695.7222 | 360.636.1068 (fax)

PROJECT NAME: IDAHO COAST PROJECT
PROJECT NUMBER: FCP-2012
PROJECT MANAGER: GREG HILDEBRAND
COMPANY NAME: HILDEBRAND ASSOCIATES, LLC
ADDRESS: 4623 E. PEGASUS CT
CITY/STATE/ZIP: BOISE, ID 83716
E-MAIL ADDRESS: GREG.HILDEBRAND@GMAIL.COM
PHONE #: 208-761-5121
FAX #: N/A
ANALYST SIGNATURE: *Greg Hildebrand*

NUMBER OF CONTAINERS			INVOICE INFORMATION		TURNAROUND REQUIREMENTS	
SAMPLE ID	DATE	TIME	LAB ID	MATRIX	24 hr	48 hr
3DC-01-01	9/4/12	1730	BDC-01-01	FISH		
3DC-01-02	9/4/12		BDC-01-02	FISH		
3DC-01-03	9/4/12		BDC-01-03	FISH		
3DC-01-04	9/4/12		BDC-01-04	FISH		
3DC-01-05	9/4/12		BDC-01-05	FISH		
3DC-01-06	9/4/12		BDC-01-06	FISH		
3DC-01-07	9/4/12		BDC-01-07	FISH		
3DC-01-08	9/4/12		BDC-01-08	FISH		
3DC-01-09	9/4/12		BDC-01-09	FISH		
3DC-01-10	9/4/12	1115	BDC-01-10	FISH		

REPORT REQUIREMENTS
I. Routine Report: Method Blank, Surrogate, as required
II. Report Dup., MS, MSD as required
III. CLP Like Summary (no raw data)
IV. Data Validation Report
V. EDD

INVOICE INFORMATION
P.O. # 23111
Bill To: 4623 E. PEGASUS CT
BOISE, ID 83716
HILDEBRAND ASSOCIATES, LLC

INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER: N/A (CIRCLE ONE)
SPECIAL INSTRUCTIONS/COMMENTS: EACH TISSUE SAMPLE WILL BE ANALYZED FOR THE ABOVE CITED METALS. SAMPLES WILL BE RAW FOR TOTAL MERCURY AND WILL BE ONLY ANALYZED FOR METHYL MERCURY IF TOTAL MERCURY CONCENTRATIONS ARE WITHIN 20% OF 0.3 MG/KG WW. IF METHYL MERCURY HAS TO BE ANALYZED PLEASE CONTACT FIRST.
☐ Sample Shipment contains USDA regulated soil samples (check box if applicable)

RELINQUISHED BY: <i>Greg Hildebrand</i> Signature: <i>Greg Hildebrand</i> Printed Name: GREG HILDEBRAND Firm: HILDEBRAND ASSOCIATES, LLC	RECEIVED BY: <i>Greg Hildebrand</i> Signature: <i>Greg Hildebrand</i> Printed Name: GREG HILDEBRAND Firm: HILDEBRAND ASSOCIATES, LLC	RELINQUISHED BY: <i>Greg Hildebrand</i> Signature: <i>Greg Hildebrand</i> Printed Name: GREG HILDEBRAND Firm: HILDEBRAND ASSOCIATES, LLC	RECEIVED BY: <i>Greg Hildebrand</i> Signature: <i>Greg Hildebrand</i> Printed Name: GREG HILDEBRAND Firm: HILDEBRAND ASSOCIATES, LLC
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SR# K10001

ALS Environmental

1317 South 13th Ave., Kelso, WA 98626 | 360.577.7222 | 800.695.7222 | 360.636.1008 (fax)

PAGE

COC#

1

[illegible]



CHAIN OF CUSTODY

1317 South 13th Ave., Kelso, WA 98626 | 360.577.7222 | 800.695.7222 | 360.636.1068 (fax)

SR# K1204069

PAGE

OF

COC#

3

PROJECT NAME IDAKO COAL PROJECT
PROJECT NUMBER ICP-2012
PROJECT MANAGER GREG HILDEBRAND
COMPANY NAME HILDEBRAND & ASSOCIATES, LLC
ADDRESS 11623 E PEGASUS CT
CITY/STATE/ZIP BOISE ID 83716
E-MAIL ADDRESS GREG.HILDEBRAND@GMAIL.COM
PHONE # 208-761-5121 FAX # N/A
SAMPLER'S SIGNATURE Greg Hildebrand

PROJECT NAME					PROJECT NUMBER					PROJECT MANAGER					COMPANY NAME					ADDRESS					CITY/STATE/ZIP					E-MAIL ADDRESS					PHONE #					SAMPLER'S SIGNATURE					NUMBER OF CONTAINERS					REMARKS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
INDAKO CORALIT PROJECT					ICP-2012					GREG HILDEBRAND					HILDEBRAND & ASSOCIATES, LLC					11623 E PEGASUS CT					BOISE ID 83716					GREG.HILDEBRAND@GMAIL.COM					208-761-5121					N/A					Greg Hildebrand																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		

REPORT REQUIREMENTS
I. Routine Report: Method Blank, Surrogate, as required
II. Report Dup., MS, MSD as required
III. CLP Like Summary (no raw data)
IV. Data Validation Report
V. EDD

INVOICE INFORMATION
P.O. # 23417
Bill To: 4623 E PEGASUS CT
BOISE ID 83716
HILDEBRAND & ASSOCIATES, LLC

TURNAROUND REQUIREMENTS
24 hr. 48 hr.
5 day
Standard (15 working days)
Provide FAX Results

Requested Report Date

Circle which metals are to be analyzed:
Total Metals: (Al) (As) (Sb) (Ba) (Be) (B) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Mo) (Ni) (K) (Ag) (Na) (Se) (Sr) (Ti) (Sn) (V) (Zn) (Hg)
Dissolved Metals: Al As Sb Ba Be B Ca Cd Cu Cr Fe Pb Ph Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg

*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER: N/A (CIRCLE ONE)
SPECIAL INSTRUCTIONS/COMMENTS: Each tissue sample will be analyzed for the above circled metals. Samples will be run for total mercury and will be only analyzed for methyl mercury if total mercury concentrations are within 20% of 0.3 mg/kg ww. If methyl mercury has to be analyzed done cannot first.

☐ Sample Shipment contains USDA regulated soil samples (check box if applicable)

RELINQUISHED BY:
Signature Greg Hildebrand Date/Time 09/12/10
Printed Name Greg Hildebrand Firm ASSOCIATES, LLC

RECEIVED BY:
Signature [Signature] Date/Time 9/12/10
Printed Name [Name] Firm [Firm]

RELINQUISHED BY:
Signature [Signature] Date/Time [Date/Time]
Printed Name [Printed Name] Firm [Firm]

6147.1

EcoAnalysts Project# : _____
 Company: Hildebrand & Associates, LLC
 Total # of Samples this project: 3 Total (T1, T2 & T3)
 # of Samples Shipped this shipment: 3 Total (T1, T2 & T3)

# of Containers	Stream	Site #	Rep	Device Type	Dimensions	Habitat	Collection Date
1 Jar	Big Deer Creek	Big Deer Creek 01	T1	Hess Sampler	13" x 16" 500 µm	Rifle	9/4/2012
1 Jar	Big Deer Creek	Big Deer Creek 01	T2	Hess Sampler	13" x 16" 500 µm	Rifle	9/4/2012
1 Jar	Big Deer Creek	Big Deer Creek 01	T3	Hess Sampler	13" x 16" 500 µm	Rifle	9/4/2012

Relinquished By/ Date: Big Hildebrand 09/09/2012 Condition: Good

Company: Hildebrand & Associates, LLC

Received By/ Date: Good 9/12/2012 Condition: Good

Company: EcoAnalysts

Relinquished By/ Date: _____ Condition: _____

Company: _____

Received By/ Date: _____ Condition: _____

Company: _____

Relinquished By/ Date: _____ Condition: _____

Company: _____

Received By/ Date: _____ Condition: _____

Company: _____

APPENDIX E

MACROINVERTEBRATE RESULTS

Hildebrand Idaho Cobalt ID BURP Benthos 2012
Dry Weights

 ANALYSTS INC.
University of Idaho Analytical Sciences Laboratory

Units: grams								
Reporting Limit: 0.001								
EcoA								
Sample ID	Site ID	Rep	Collect Date	Matrix	Parameter	Sample Weight - Dry	Analysis Method	ASL ID
6147.1-1	Big Deer Creek 01	T1	04-Sep-12	Solid - Wet Weight	Sample Weight - Dry	0.055	Gravimetric	E1202817
6147.1-2	Big Deer Creek 01	T2	04-Sep-12	Solid - Wet Weight	Sample Weight - Dry	0.157	Gravimetric	E1202818
6147.1-3	Big Deer Creek 01	T3	04-Sep-12	Solid - Wet Weight	Sample Weight - Dry	0.118	Gravimetric	E1202819

Hildebrand Idaho Cobalt ID BURP Benthos 2012
Sort Report



							Estimated	Estimated						
EcoA	Collection						Pre-Rinse	Post-Rinse			Estimated	Estimated	Estimated	
Sample ID	Stream	Site ID	Rep	Date	Sorter	Sort Date	Primary Matrix	Volume (L)	Volume (L)	QC Sorter	QC Date	%Recovery1	%Recovery2	%Recovery3
6147.1-1	Big Deer Creek	Big Deer Creek 01	T1	09/04/12	Susie Patton	09/28/12	Inorganic	0.16	0.06	Megan Payne	09/28/12	100.00	N/A	N/A
6147.1-2	Big Deer Creek	Big Deer Creek 01	T2	09/04/12	Susie Patton	09/28/12	Inorganic	0.15	0.10	Megan Payne	09/28/12	100.00	N/A	N/A
6147.1-3	Big Deer Creek	Big Deer Creek 01	T3	09/04/12	Susie Patton	09/28/12	Inorganic	0.05	0.05	Megan Payne	09/28/12	100.00	N/A	N/A

Hildebrand Idaho Cobalt ID BURP Benthos 2012
Data are adjusted for subsampling
**Calculations use EcoAnalysts standard attributes

EcoANALYSTS, INC.

Stream	Big Deer Creek	Big Deer Creek	Big Deer Creek
Site ID	Big Deer Creek 01	Big Deer Creek 01	Big Deer Creek 01
Rep	T1	T2	T3
Collection Date	09-04-2012	09-04-2012	09-04-2012
Device	Hess Sampler	Hess Sampler	Hess Sampler
Percent Subsampled	100.00	100.00	100.00
EcoAnalysts Sample ID	6147.1-1	6147.1-2	6147.1-3
Abundance Measures			
Corrected Abundance	228.00	447.00	500.00
EPT Abundance	128.00	253.00	240.00
Dominance Measures			
Dominant Taxon	Heterlimnius sp.	Zapada cinctipes	Heterlimnius sp.
Dominant Abundance	34.00	86.00	123.00
2nd Dominant Taxon	Zapada cinctipes	Heterlimnius sp.	Zapada cinctipes
2nd Dominant Abundance	17.00	33.00	41.00
3rd Dominant Taxon	Taeniopterygidae	Cinygmula sp.	Cinygmula sp.
3rd Dominant Abundance	16.00	25.00	35.00
% Dominant Taxon	14.91	19.24	24.60
% 2 Dominant Taxa	22.37	26.62	32.80
% 3 Dominant Taxa	29.39	32.21	39.80
Richness Measures			
Species Richness	42.00	54.00	50.00
EPT Richness	20.00	29.00	26.00
Ephemeroptera Richness	7.00	11.00	11.00
Plecoptera Richness	7.00	8.00	8.00
Trichoptera Richness	6.00	10.00	7.00
Chironomidae Richness	9.00	11.00	12.00
Oligochaeta Richness	0.00	0.00	0.00
Non-Chiro. Non-Olig. Richness	33.00	43.00	38.00
Rhyacophila Richness	2.00	3.00	3.00
Community Composition			
% Ephemeroptera	23.25	17.23	27.80
% Plecoptera	25.00	28.41	16.00
% Trichoptera	7.89	10.96	4.20
% EPT	56.14	56.60	48.00
% Coleoptera	19.74	10.51	29.20
% Diptera	11.84	21.25	11.00
% Oligochaeta	0.00	0.00	0.00
% Baetidae	4.39	2.68	3.60
% Brachycentridae	2.63	3.36	1.00
% Chironomidae	10.53	19.91	10.20
% Ephemerellidae	6.58	5.59	11.40
% Hydropsychidae	0.44	0.22	0.40
% Odonata	0.00	0.00	0.00
% Perlidae	2.63	2.01	0.60
% Pteronarcyidae	0.00	0.00	0.00
% Simuliidae	0.00	0.00	0.00
Functional Group Composition			
% Filterers	2.19	4.70	1.00
% Gatherers	32.46	34.90	45.20
% Predators	23.68	19.02	17.80
% Scrapers	18.86	11.63	19.20
% Shredders	16.67	25.73	10.00
% Piercer-Herbivores	0.00	0.00	0.00
% Unclassified	0.00	0.22	0.00
Filterer Richness	2.00	3.00	1.00
Gatherer Richness	13.00	19.00	18.00
Predator Richness	13.00	16.00	18.00
Scraper Richness	7.00	7.00	8.00
Shredder Richness	5.00	7.00	4.00
Piercer-Herbivore Richness	0.00	0.00	0.00
Unclassified	0.00	1.00	0.00
Diversity/Evenness Measures			
Shannon-Weaver H' (log 10)	1.41	1.44	1.33
Shannon-Weaver H' (log 2)	4.69	4.79	4.42
Shannon-Weaver H' (log e)	3.25	3.32	3.07
Margalef's Richness	7.55	8.68	7.88
Pielou's J'	0.87	0.83	0.78
Simpson's Heterogeneity	0.95	0.94	0.91
Biotic Indices			
% Indiv. w/ HBI Value	94.74	94.41	92.40
Hilsenhoff Biotic Index	2.81	3.19	3.13
% Indiv. w/ MTI Value	67.11	76.51	74.20
Metals Tolerance Index	2.57	2.58	2.51
% Indiv. w/ FSBI Value	67.98	62.42	73.80
Fine Sediment Biotic Index	120.00	153.00	144.00
FSBI - average	2.86	2.83	2.88
FSBI - weighted average	5.21	4.70	5.07
% Indiv. w/ TPM Value	78.95	69.80	78.00
Temp. Pref. Metric - average	4.50	4.30	4.36
TPM - weighted average	6.77	6.03	6.60
Karr BIBI Metrics			
Long-Lived Taxa Richness	10.00	10.00	7.00
Clinger Richness	22.00	28.00	26.00
% Clingers	73.25	67.34	77.60
Intolerant Taxa Richness	19.00	26.00	22.00
% Tolerant Individuals	2.31	3.32	3.03
% Tolerant Taxa	4.76	3.70	4.00
Coleoptera Richness	4.00	4.00	3.00

Hildebrand Idaho Cobalt ID BURP Benthos 2012
Data are NOT adjusted for subsampling
Idaho Basins SMI calculations located below TOTAL

EcoANALYSTS, INC.

Stream	Big Deer Creek	Big Deer Creek	Big Deer Creek
Site ID	Big Deer Creek 01	Big Deer Creek 01	Big Deer Creek 01
Rep	T1	T2	T3
Collection Date	09-04-2012	09-04-2012	09-04-2012
Device	Hess Sampler	Hess Sampler	Hess Sampler
Percent Subsampled	100.00	100.00	100.00
EcoAnalysts Sample ID	6147.1-1	6147.1-2	6147.1-3
Ephemeroptera Acentrella turbida	0	0	1
mayflies Baetis tricaudatus	10	12	17
Caudatella hystrix	0	1	2
Cinygmula sp.	4	25	35
Drunella coloradensis/flavilinea	2	2	4
Drunella dodsii	13	17	34
Epeorus deceptivus/hesperus	3	1	2
Epeorus grandis/permagmus	7	8	6
Ephemerella sp.	0	4	16
Leptophlebiidae	0	2	0
Rhithrogena sp.	14	4	21
Serratella tibialis	0	1	1
Plecoptera Chloroperlidae	0	1	6
stoneflies Doroneuria sp.	6	9	3
Megarcys sp.	2	1	1
Paraperla sp.	0	0	1
Perlodidae	2	2	4
Sweltsa sp.	12	11	17
Taeniopterygidae	16	5	7
Zapada cinctipes	17	86	41
Zapada columbiana	2	12	0
Coleoptera Heterelmnius sp.	34	33	123
beetles Lara sp.	1	0	0
Narpus sp.	0	1	0
Optioservus sp.	9	9	20
Zaitzevia sp.	1	4	3
Diptera-Chironomidae Briliia sp.	0	5	1
nonbiting midges Cricotopus sp.	0	0	1
Eukiefferiella gracei gr.	3	8	1
Eukiefferiella tirolensis	0	1	0
Micropsectra sp.	6	20	15
Orthoclaadiinae	0	0	1
Orthocladius (Euortho.) rivulorum	0	1	0
Orthocladius (Euorthocladius) sp.	1	0	1
Orthocladius Complex	2	1	4
Orthocladius sp.	3	2	2
Potthastia gaedii gr.	4	6	11
Rheocricotopus sp.	1	19	8
Thienemanniella sp.	1	6	1
Tvetenia bavarica gr.	3	20	5
Diptera Bezzia/Palpomyia sp.	2	4	3
flies Dicranota sp.	0	1	1
Pericoma/Telmatoscopus sp.	0	1	0
Rhabdomastix fascigera gr.	1	0	0
Trichoptera Amiocentrus aspilus	0	1	0
caddisflies Arctopsyche grandis	1	1	0
Brachycentrus americanus	4	13	5
Dolophilodes sp.	0	7	0
Glossosoma sp.	4	3	4
Lepidostoma sp.	0	5	0
Micrasema sp.	2	1	0
Neophylax sp.	0	0	4
Parapsyche elsis	0	0	2
Rhyacophila betteni gr.	0	1	1
Rhyacophila brunnea gr.	6	11	2
Rhyacophila sp.	0	6	3
Rhyacophila vagrita gr.	1	0	0
Acari Atractides sp.	1	0	1
water mites Lebertia sp.	4	5	15
Protzia sp.	1	1	2
Sperchon sp.	2	7	9
Stygothrombium sp.	0	1	0
Torrenticola sp.	2	7	8
Crustacea Ostracoda	5	14	14
Other Organisms Polycelis sp.	13	17	10
TOTAL	228	447	500
IDAHO SMI BASINS SCORE	94.64	99.84	97.12
IDAHO SMI BASINS RATING	Very Good	Very Good	Very Good
	*Sample 1 did not reach the 500 count minimum for the SMI calculation	*Sample 2 did not reach the 500 count minimum for the SMI calculation	

APPENDIX F

WOLMAN PEBBLE COUNT

9217537565

Wolman Pebble Count

Substrate Data

	Riffle 1			Riffle 2			Riffle 3		
	Outside Wetted	Within Wetted		Outside Wetted	Within Wetted		Outside Wetted	Within Wetted	
Silt/Clay 0-1 mm	03	03		03	05		03	02	
Sand 1.1-2.5 mm	02	03		02	04		05	04	
Sub Total	05	06	06	06	09	09	09	10	06
Very Fine Pebble 2.51 - 6 mm									
Pebble 6. -15 mm									
Coarse Pebble 15.1 - 31 mm									
Very Coarse Pebble 31.1 - 64 mm									
Small Cobble 64.1 - 128 mm									
Large Cobble 128.1 - 256 mm									
Small Boulder 256.1 - 512 mm									
Medium Boulder 512.1 - 1024 mm									
Large Boulder 1024 mm & Larger									
TOTAL	06	10	10	08	14	14	09	11	11

SITE ID:

20085BDC-01

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2008 Burp

APPENDIX G

FISH TISSUE / METAL RESULTS

TABLE 4
Big Deer Creek -01
Metals Dry Weight Basis
Formation Capital Corporation
Idaho Cobalt Project Monitoring Summary, September, 2012
Lemhi, County, Idaho

Cenhi, County, Idaho												
Lab ID	K1209055-031	K1209055-031D	K1209055-033	K1209055-035	K1209055-037	K1209055-039	K1209055-041	K1209055-043	K1209055-045	K1209055-047	K1209055-049	Notes
Hildebrand Sample ID	BDC-01-01	BDC-01-01	BDC-01-02	BDC-01-03	BDC-01-04	BDC-01-05	BDC-01-06	BDC-01-07	BDC-01-08	BDC-01-09	BDC-01-10	
Sample Date	9/4/2012	9/4/2012	9/4/2012	9/4/2012	9/4/2012	9/4/2012	9/4/2012	9/4/2012	9/4/2012	9/4/2012	9/4/2012	
Sample Time	10:24	10:24	10:26	10:28	10:29	10:30	10:32	10:34	10:35	10:37	10:39	
TRACE METALS - EPA METHOD 200.8												
Units¹	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	
Aluminum, Total	8.50	7.80	0.8 J	2.40	12.00	2.0 J	1.1 J	2.30	3.90	2.20	1.4 J	
Arsenic, Total	0.88	0.89	0.43 J	0.29 J	0.44 J	0.15 J	1.07	0.23 J	0.60	0.45 J	0.55	
Cadmium, Total	0.010 J	0.012 J	0.015 J	0.017 J	0.021	0.007 J	0.011 J	0.027	0.053	0.023	0.019 J	
Cobalt, Total	1.310	1.357	0.84	0.7360	0.414	0.645	0.454	1.040	0.557	0.901	1.070	
Lead, Total	0.0036 J	0.0043 J	0.0024 J	0.0046 J	0.0060 J	0.0040 J	0.0033 J	0.0045 J	0.0214	0.0166 J	0.0057 J	
Manganese, Total	1.04	1.05	0.96	1.6300	0.85	0.79	0.61	1.45	0.7600	0.7000	0.88	
Nickel, Total	0.08 J	0.10 J	0.02 J	0.02 U	0.08 J	0.02 J	0.02 U	0.26	0.02 U	0.02 J	0.02 U	
Thallium, Total	0.0167 J	0.0185 J	0.0160 J	0.0230	0.0140 J	0.0267	0.0088 J	0.0199	0.0153 J	0.0268	0.0044 J	
Zinc, Total	28.90	28.89	24.9	28.4	26.0	20.1	21.5	31.8	37.5	30.9	32.0	
EPA METHOD 1631E												
Units¹	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	
Mercury, Total	0.148	**	0.238	0.165	0.300	0.133	0.170	0.184	0.240	0.201	0.0774	
EPA METHOD 7742												
Units¹	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	
Selenium, Total	1.28 *	1.74 *	0.92 *	1.66 *	1.36 *	2.02 *	2.05 *	2.08 *	1.91 *	1.66 *	0.63 *	

Notes:
¹ Metals results reported in milligram per kilogram
² Metals results reported in nanogram per gram
³ Metals results reported in milligram per kilogram
⁴ Total solids results reported in percent
J The result is an estimated value.
U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL
ID Identification
J Analyte present below calibration ratio
* The result is an outlier. See case narrative
** See mercury matrix spike/duplicate matrix spike summaries, pages 32-40

TABLE 5
Big Deer Creek - 01
Metals Wet Weight Basis
Formation Capital Corporation
Idaho Cobalt Project Monitoring Summary, September, 2012
Lemhi, County, Idaho

Lab ID	K1209055-031	K1209055-031D	K1209055-033	K1209055-035	K1209055-037	K1209055-039	K1209055-041	K1209055-043	K1209055-045	K1209055-047	K1209055-049	Notes
Hildebrand Sample ID	BDC-01-01	BDC-01-01	BDC-01-02	BDC-01-03	BDC-01-04	BDC-01-05	BDC-01-06	BDC-01-07	BDC-01-08	BDC-01-09	BDC-01-10	
Sample Date	9/4/2012	9/4/2012	9/4/2012	9/4/2012	9/4/2012	9/4/2012	9/4/2012	9/4/2012	9/4/2012	9/4/2012	9/4/2012	
Sample Time	10:24	10:24	10:26	10:28	10:29	10:30	10:32	10:34	10:35	10:37	10:39	
TRACE METALS - EPA METHOD 200.8												
Units ¹	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	
Aluminum, Total	1.95	N/A	0.19 J	0.54	2.50	0.45 J	0.23 J	0.54	0.75	0.49	0.32 J	
Arsenic, Total	0.20	N/A	0.096 J	0.087 J	0.092 J	0.035 J	0.234	0.053 J	0.114	0.103 J	0.124	
Cadmium, Total	0.0022 J	N/A	0.0034 J	0.0038 J	0.0044	0.0016 J	0.0023 J	0.0062	0.0101	0.0052	0.0043 J	
Cobalt, Total	0.302	N/A	0.19	0.168	0.0861	0.146	0.0995	0.24	0.106	0.205	0.240	
Lead, Total	0.0008 J	N/A	0.0005 J	0.0011 J	0.0013 J	0.0009 J	0.0007 J	0.0010 J	0.0041	0.0038 J	0.0013 J	
Manganese, Total	0.24	N/A	0.216	0.372	0.177	0.178	0.133	0.333	0.145	0.160	0.198	
Nickel, Total	0.019 J	N/A	0.005	0.004 U	0.016 J	0.005 J	0.004 U	0.060	0.004 U	0.005 J	0.004 U	
Thallium, Total	0.0038 J	N/A	0.0036	0.0048	0.0029 J	0.0061	0.0019 J	0.0048	0.0029	0.0061	0.0010J	
Zinc, Total	6.65	N/A	5.64	6.48	5.42	4.57	4.7	7.31	7.14	7.1	7.21	
EPA METHOD 1631E												
Units ¹	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	
Mercury, Total	0.0340	**	0.0538	0.0376	0.0624	0.0302	0.0372	0.0423	0.0458	0.0458	0.0174	
EPA METHOD 7742												
Units ¹	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	
Selenium, Total	0.29 *	N/A	0.21 *	0.42 *	0.28 *	0.46 *	0.45 *	0.48 *	0.36 *	0.38 *	0.14 *	
FREEZE DRY												
Units ⁴	%	%	%	%	%	%	%	%	%	%	%	
Total Solids ⁴	23	23.1	22.6	22.8	20.8	22.7	21.9	23	19.1	22.8	22.5	

Notes:
1 Metals results reported in milligram per kilogram
2 Metals results reported in nanogram per gram
3 Metals results reported in milligram per kilogram
4 Total solids results reported in percent
5 Total solids are only expressed on a wet weight basis
J The result is an estimated value.
U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
ID Identification
J Analyte present below calibration ratio
N/A Not available
% Percent
* The result is an outlier. See case narrative
** See mercury matrix spike/duplicate matrix spike summaries, pages 32-40

TABLE 6
Big Deer Creek - 02
Metals Dry Weight Basis
Formation Capital Corporation
Idaho Cobalt Project Monitoring Summary, September, 2012
Lemhi, County, Idaho

emhi, County, Idaho

Lab ID	K1209055-051	K1209055-053	K1209055-055	K1209055-057	K1209055-059	K1209055-061	K1209055-063	K1209055-065	K1209055-067	K1209055-069	Notes
Hildebrand Sample ID	BDC-02-01	BDC-02-02	BDC-02-03	BDC-02-04	BDC-02-05	BDC-02-06	BDC-02-07	BDC-02-08	BDC-02-09	BDC-02-10	
Sample Date	9/4/2012	9/4/2012	9/4/2012	9/4/2012	9/4/2012	9/4/2012	9/4/2012	9/4/2012	9/4/2012	9/4/2012	
Sample Time	12:39	12:41	12:43	12:45	12:46	12:48	12:50	12:51	12:52	12:54	
TRACE METALS - EPA METHOD 200.8											
Units ¹	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	
Aluminum, Total	4.20	1.0 J	1.0 J	1.1 J	1.5 J	141	1.7 J	1.2 J	1.3 J	1.0 J	
Arsenic, Total	0.40 J	1.05	0.15 J	0.49 J	0.63	0.62	1.24	0.34 J	0.85	0.76	
Cadmium, Total	0.058	0.026	0.027	0.030	0.031	0.051	0.068	0.062	0.026	0.081	
Cobalt, Total	0.116	0.035	0.061	0.080	0.156	0.539	0.081	0.068	0.037	0.086	
Lead, Total	0.0111 J	0.0015 J	0.0008 J	0.0161 J	0.0012 J	0.0475	0.0028 J	0.0015 J	0.0087 J	0.0104 J	
Manganese, Total	0.95	0.62	0.72	0.67	0.73	3.49	1.01	0.7100	0.6600	0.79	
Nickel, Total	0.02 U	0.03 J	0.02 U	0.1500	0.02 U	0.36	0.02 U	0.02 U	0.04 J	0.04 J	
Thallium, Total	0.0133 J	0.0150 J	0.0151 J	0.0207	0.0118 J	0.0183 J	0.0163 J	0.0144 J	0.0142 J	0.0175 J	
Zinc, Total	34.4	25.9	25.4	21.7	38.8	23.4	27.2	41.2	25.8	27.6	
EPA METHOD 1631E											
Units ¹	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	
Mercury, Total	0.498	0.437	0.378	0.271	0.168	0.243	0.231	0.298	0.219	0.226	
EPA METHOD 7742											
Units ¹	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	
Selenium, Total	1.50 *	2.58 *	1.83*	1.51 *	1.99 *	1.73 *	0.29 *	1.52 *	1.08 *	2.66 *	

Notes:
1 Metals results reported in milligram per kilogram
2 Metals results reported in nanogram per gram
3 Metals results reported in milligram per kilogram
4 Total solids results reported in percent
J The result is an estimated value.
U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL
ID Identification
* The result is an outlier. See case narrative

TABLE 7
Big Deer Creek - 02
Metals Wet Weight Basis
Formation Capital Corporation
Idaho Cobalt Project Monitoring Summary, September, 2012
Lemhi, County, Idaho

5

Lab ID	K1209055-051	K1209055-053	K1209055-055	K1209055-057	K1209055-059	K1209055-061	K1209055-063	K1209055-065	K1209055-067	K1209055-069	Notes
Hildebrand Sample ID	BDC-02-01	BDC-02-02	BDC-02-03	BDC-02-04	BDC-02-05	BDC-02-06	BDC-02-07	BDC-02-08	BDC-02-09	BDC-02-10	
Sample Date	9/4/2012	9/4/2012	9/4/2012	9/4/2012	9/4/2012	9/4/2012	9/4/2012	9/4/2012	9/4/2012	9/4/2012	
Sample Time	12:39	12:41	12:43	12:45	12:46	12:48	12:50	12:51	12:52	12:54	
TRACE METALS - EPA METHOD 200.8											
Units¹	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	
Aluminum, Total	0.87	0.21 J	0.23 J	0.24 J	0.31 J	28.4	0.38 J	0.24 J	0.27 J	0.22 J	
Arsenic, Total	0.82 J	0.223	0.035 J	0.108 J	0.132	0.124	0.272	0.071 J	0.186	0.163	
Cadmium, Total	0.0120	0.0058	0.0063	0.0067	0.0068	0.0102	0.0149	0.0128	0.0057	0.0131	
Cobalt, Total	0.0239	0.0074	0.0140	0.0177	0.0325	0.108	0.0179	0.0141	0.0080	0.0186	
Lead, Total	0.0023 J	0.0003 J	0.0002 J	0.0038 J	0.0003 J	0.0095	0.0006 J	0.0003 J	0.0019 J	0.0022 J	
Manganese, Total	0.195	0.131	0.166	0.149	0.153	0.702	0.222	0.147	0.144	0.171	
Nickel, Total	0.004 U	0.006 J	0.004 U	0.032 J	0.004 U	0.073	0.004 U	0.004 U	0.009 J	0.008 J	
Thallium, Total	0.0027 J	0.0032 J	0.0035 J	0.0046	0.0025 J	0.0037	0.0038 J	0.0030 J	0.0031 J	0.0038 J	
Zinc, Total	7.08	5.52	5.85	4.84	7.70	4.71	5.98	8.54	5.63	5.96	
EPA METHOD 1631E											
Units²	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	
Mercury, Total	0.103	0.0931	0.0869	0.0604	0.0347	0.0491	0.0508	0.0617	0.0477	0.0488	
EPA METHOD 7742											
Units³	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	
Selenium, Total	0.31 *	0.55 *	0.42*	0.34 *	0.42 *	0.35 *	0.72 *	0.32 *	0.24 *	0.57 *	
FREEZE DRY											
Units⁴	%	%	%	%	%	%	%	%	%	%	
Total Solids⁵	20.6	21.3	23	22.3	20.9	20.2	22	20.7	21.8	21.6	

Notes:
1 Metals results reported in milligram per kilogram
2 Metals results reported in nanogram per gram
3 Metals results reported in milligram per kilogram
4 Total solids results reported in percent
5 Total solids are only expressed on a wet weight basis
J The result is an estimated value.
U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL
ID Identification
% Percent
* The result is an outlier. See case narrative

TABLE 8
Upper Blackbird Creek - 01
Metals Dry Weight Basis
Formation Capital Corporation
Idaho Cobalt Project Monitoring Summary, September, 2012
Lemhi, County, Idaho

Lab ID	K1209055-071	K1209055-071D	K1209055-073	K1209055-075	K1209055-077	K1209055-079	K1209055-081	K1209055-081D	K1209055-083	K1209055-085	K1209055-087	K1209055-089	Notes
Hildebrand Sample ID	UBC-01	UBC-01	UBC-02	UBC-03	UBC-04	UBC-05	UBC-06	UBC-08	UBC-07	UBC-08	UBC-09	UBC-10	
Sample Date	9/5/2012	9/5/2012	9/5/2012	9/5/2012	9/5/2012	9/5/2012	9/5/2012	9/5/2012	9/5/2012	9/5/2012	9/5/2012	9/5/2012	
Sample Time	10:24	10:24	10:26	10:28	10:29	10:30	10:32	10:32	10:34	10:35	10:37	10:39	
TRACE METALS - EPA METHOD 200.8													
Units ¹	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	Chain of custody has sample ID for Upper Black Bird Creek as UBC, however, laboratory reported it as MBC
Aluminum, Total	5.00	6.60	41.90	2.90	1.0 J	1.1 J	2.1	N/A	0.5 J	2.00	0.6 J	2.10	
Arsenic, Total	0.85	0.86	0.97	0.32 J	1.26	0.63	0.14 J	N/A	0.68	0.63	0.54	0.26 J	
Cadmium, Total	0.015 J	0.016 J	0.011 J	0.019 J	0.018 J	0.011 J	0.015 J	N/A	0.010 J	0.037	0.011 J	0.029	
Cobalt, Total	1.430	1.455	0.908	0.565	1.92	1.11	0.202	N/A	0.955	0.951	0.635	0.491	
Lead, Total	N/A	N/A	0.0057 J	0.0036 J	0.0014 J	0.0017 J	0.0025 J	0.0641	0.0041 J	0.0016 J	0.0011 J	0.0016 J	
Manganese, Total	4.51	4.59	13.90	2.47	18.10	5.81	0.64	N/A	5.98	6.25	3.09	1.08	
Nickel, Total	0.13 J	0.13 J	0.11 J	0.03 J	0.08 J	0.04 J	0.03 J	N/A	0.03 J	0.03 J	0.02 J	0.03 J	
Thallium, Total	0.0097 J	0.0118 J	0.0019 J	0.0025 J	0.0077 J	0.0084 J	0.0040 J	N/A	0.0088	0.0060 J	0.0027 J	0.0064 J	
Zinc, Total	58.42 *	77.10 *	24.8 *	35.5 *	34.5 *	30.3 *	34.1 *	N/A	42.9 *	43.1 *	44.1 *	40.0 *	
EPA METHOD 1631E													
Units ²	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	
Mercury, Total	0.618	**	0.211	0.242	0.181	0.161	0.180	**	0.154	0.326	0.220	0.294	
EPA METHOD 7742													
Units ³	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	
Selenium, Total	1.40	0.98	0.51	1.04	1.32	1.65	1.20	N/A	1.93	1.40	1.85	1.86	

Notes:
¹ Metals results reported in milligram per kilogram
² Metals results reported in nanogram per gram
³ Metals results reported in milligram per kilogram
⁴ Total solids results reported in percent
J The result is an estimated value.
ID Identification
J Analyte present below calibration ratio
N/A Not available
** See mercury matrix spike/duplicate matrix spike summaries, pages 32-40
* The result is an outlier. See case narrative

TABLE 9
Upper Blackbird Creek - 01
Metals Wet Weight Basis
Formation Capital Corporation
Idaho Cobalt Project Monitoring Summary, September, 2012
Lemhi, County, Idaho

Lab ID	K1209055-071	K1209055-071D	K1209055-073	K1209055-075	K1209055-077	K1209055-079	K1209055-081	K1209055-081D	K1209055-083	K1209055-085	K1209055-087	K1209055-089	Notes
Hildebrand Sample ID	UBC-01	UBC-01	UBC-02	UBC-03	UBC-04	UBC-05	UBC-06	UBC-06	UBC-07	UBC-08	UBC-09	UBC-10	
Sample Date	9/5/2012	9/5/2012	9/5/2012	9/5/2012	9/5/2012	9/5/2012	9/5/2012	9/5/2012	9/5/2012	9/5/2012	9/5/2012	9/5/2012	
Sample Time	10:24	10:24	10:26	10:28	10:29	10:30	10:32	10:32	10:34	10:35	10:37	10:39	
TRACE METALS - EPA METHOD 200.8													
Units¹	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	Chain of custody has sample ID for Upper Black Bird Creek as UBC, however, laboratory reported it as MBC
Aluminum, Total	0.94	N/A	10.2	0.59	0.21 J	0.23 J	0.45	N/A	0.11 J	0.42	0.12 J	0.43	
Arsenic, Total	0.160	N/A	0.236	0.065 J	0.267	0.130	0.030 J	N/A	0.140	0.130	0.109	0.054 J	
Cadmium, Total	0.0028 J	N/A	0.0028 J	0.0039 J	0.0039 J	0.0024 J	0.0033 J	N/A	0.0021 J	0.0076	0.0023 J	0.0060	
Cobalt, Total	0.271	N/A	0.221	0.177	0.406	0.229	0.0430	N/A	0.197	0.197	0.129	0.100	
Lead, Total	0.0006 J	N/A	0.0014 J	0.0007 J	0.0003 J	0.0004 J	0.0005 J	N/A	0.0008 J	0.0003 J	0.0002 J	0.0003 J	
Manganese, Total	0.853	N/A	3.380	0.511	3.830	1.200	0.137	N/A	1.230	1.290	0.628	0.221	
Nickel, Total	0.025 J	N/A	0.027 J	0.007 J	0.017 J	0.009 J	0.006 J	N/A	0.005 J	0.006 J	0.004 J	0.005 J	
Thallium, Total	0.0018 J	N/A	0.0005 J	0.0005 J	0.0016 J	0.0013 J	0.0008 J	N/A	0.0018 J	0.0012 J	0.0005 J	0.0013 J	
Zinc, Total	11.0 *	N/A	6.02 *	7.35 *	7.30 *	6.28 *	7.26 *	N/A	8.83 *	8.92 *	8.96 *	8.16 *	
EPA METHOD 1631E													
Units²	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	
Mercury, Total	0.117	--	0.0513	0.0501	0.0384	0.0333	0.0383	--	0.0317	0.0675	0.0447	0.0600	
EPA METHOD 7742													
Units³	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	
Selenium, Total	0.26	N/A	0.12	0.22	0.28	0.34	0.25	N/A	0.40	0.29	0.38	0.38	
FREEZE DRY													
Units⁴	%	%	%	%	%	%	%	%	%	%	%	%	
Total Solids⁵	19	19.3	24.3	20.7	21.2	20.7	21.3	N/A	20.6	20.7	20.3	20.4	

Notes:
1 Metals results reported in milligram per kilogram
2 Metals results reported in nanogram per gram
3 Metals results reported in milligram per kilogram
4 Total solids results reported in percent
5 Total solids are only expressed on a wet weight basis
J The result is an estimated value.
ID Identification
J Analyte present below calibration ratio
% Percent
N/A Not available
** See mercury matrix spike/duplicate matrix spike summaries, pages 32-40
* The result is an outlier. See case narrative

TABLE 10
Method Blanks Dry Weight Basis
Formation Capital Corporation
Idaho Cobalt Project Monitoring Summary, September, 2012
Lemhi, County, Idaho

Lab ID	K1209055-MB1	K1209055-MB2	Notes
Hildebrand Sample ID	N/A	N/A	
Sample Date	10/8/2012	10/8/2012	
TRACE METALS - EPA METHOD 200.8			
Units ¹	mg/Kg	mg/Kg	
Aluminum, Total	0.2 U	0.4 J	
Arsenic, Total	0.02 U	0.02 U	
Cadmium, Total	0.002 U	0.002 U	
Cobalt, Total	0.003 U	0.003 U	
Lead, Total	0.0009 J	0.0015 J	Analyzed on 10/15/12
Manganese, Total	0.02 U	0.02 U	
Nickel, Total	0.02 U	0.02 U	
Thallium, Total	0.0027 J	0.0009 U	
Zinc, Total	0.08 J	0.38 J *	
EPA METHOD 7742			
Units ¹	mg/Kg	mg/Kg	
Selenium, Total	0.05 * U	0.05 U	Analyzed on 10/10/12

Notes:
¹ Metals results reported in milligram per kilogram
J The result is an estimated value.
ID Identification
* The result is an outlier. See case narrative.
U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.

TABLE 11
Method Blanks Wet Weight Basis
Formation Capital Corporation
Idaho Cobalt Project Monitoring Summary, September, 2012
Lemhi, County, Idaho

Lab ID	K1209055-MB1	K1209055-MB2	Notes
Hildebrand Sample ID	N/A	N/A	
Sample Date	10/8/2012	10/8/2012	
TRACE METALS - EPA METHOD 200.8			
Units ¹	mg/Kg	mg/Kg	
Aluminum, Total	0.04 U	0.08 J	
Arsenic, Total	0.004 U	0.004 U	
Cadmium, Total	0.0004 U	0.0004 U	
Cobalt, Total	0.0006 U	0.0006 U	
Lead, Total	0.0002 J	0.0003 J	Analyzed on 10/15/12
Manganese, Total	0.004 U	0.004 U	
Nickel, Total	0.004 U	0.004 U	
Thallium, Total	0.0005 J	0.0002 U	
Zinc, Total	0.02 J	0.38 J *	
EPA METHOD 7742			
Units ¹	mg/Kg	mg/Kg	
Selenium, Total	0.01 * U	0.01 U	Analyzed on 10/10/12

Notes:

1 Metals results reported in milligram per kilogram

J The result is an estimated value.

ID Identification

* The result is an outlier. See case narrative.

U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.

TABLE 12
Mercury Method Blanks Dry Weight Basis
Formation Capital Corporation
Idaho Cobalt Project Monitoring Summary, September, 2012
Lemhi, County, Idaho

Lab ID	K1209055-MB1	K1209055-MB2	K1209055-MB3	Notes
Hildebrand Sample ID	N/A	N/A	N/A	
Sample Date	10/19/2012	10/19/2012	10/19/2012	
EPA METHOD 1631E				
Units ¹	mg/Kg	mg/Kg	mg/Kg	
Mercury, Total	ND	ND	ND	

Notes:

- ¹ Metals results reported in nanogram per gram
- J The result is an estimated value.
- ID Identification
- * The result is an outlier. See case narrative.
- ND Not Detected

TABLE 13
Mercury Method Blanks Wet Weight Basis
Formation Capital Corporation
Idaho Cobalt Project Monitoring Summary, September, 2012
Lemhi, County, Idaho

Lab ID	K1209055-MB1	K1209055-MB2	K1209055-MB3	Notes
Hildebrand Sample ID	N/A	N/A	N/A	
Sample Date	10/19/2012	10/19/2012	10/19/2012	
EPA METHOD 1631E				
Units ¹	mg/Kg	mg/Kg	mg/Kg	
Mercury, Total	ND	ND	ND	

Notes:
¹ Metals results reported in nanogram per gram
J The result is an estimated value.
ID Identification
* The result is an outlier. See case narrative.
ND Not Detected